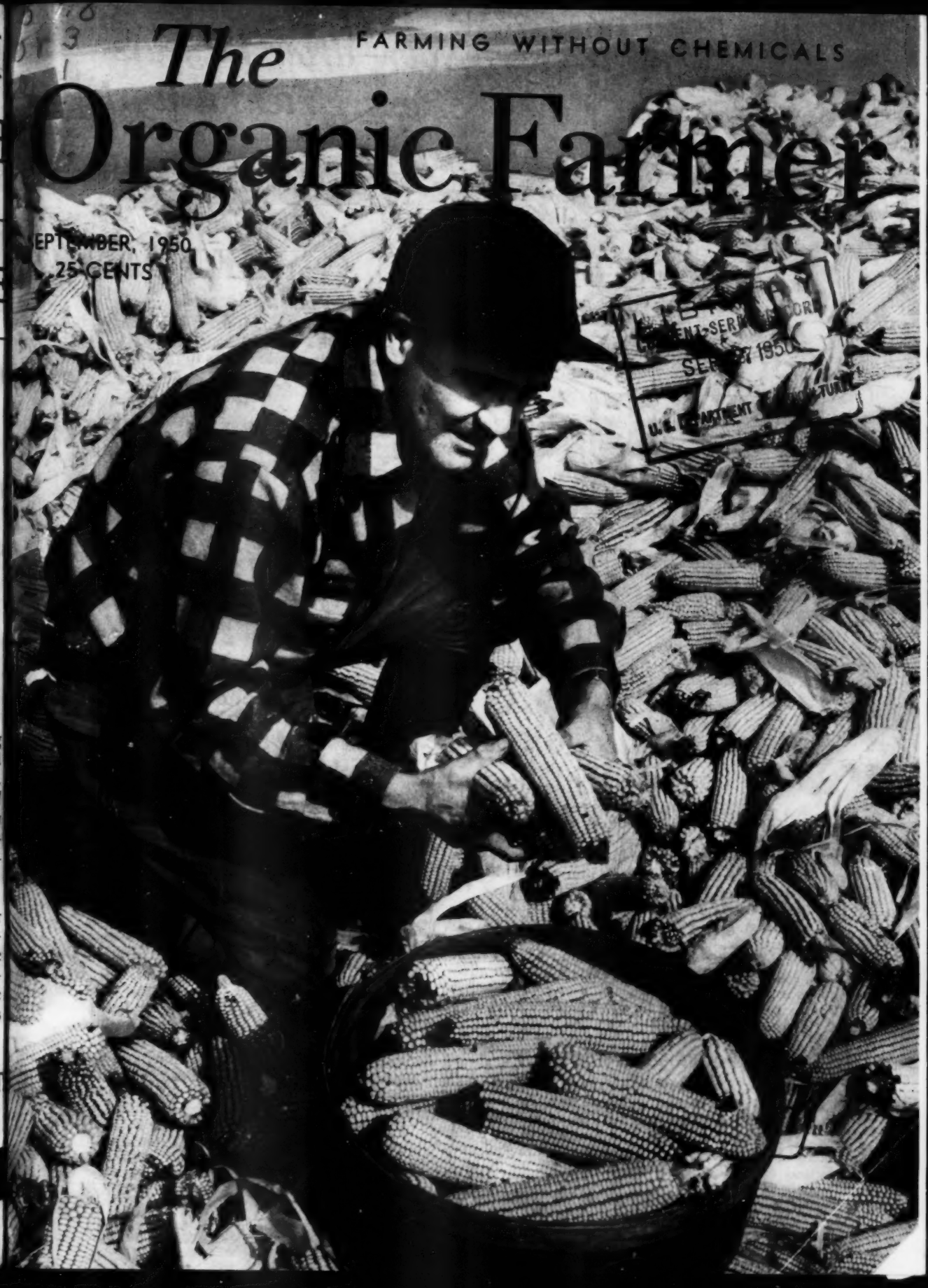
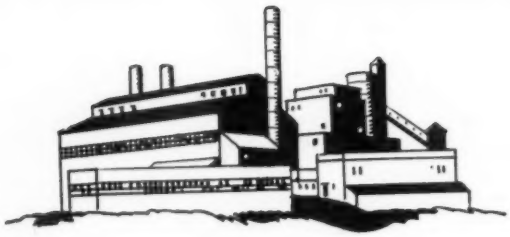
FARMING WITHOUT CHEMICALS

The Organic Farmer

EPTEMBER, 1950
25 CENTS





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REGISTERED

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TRADE MARK

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Containing 8% Total Natural Marine Potash Mineral

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8 blossoms, no seeds

FOR THE DEFINITE IMPROVEMENT OF YOUR CROPS

The clover shown in the accompanying photographs was grown as a follow-up to tobacco. The clover at the right is from soil that received an application of KAYLORITE prior to the planting of tobacco. Note the numerous blossoms and the fullness of the plant. The photo at the left shows clover grown on soil that received no KAYLORITE. It contains few blossoms and growth is sparse in comparison to the "green sanded" plant. The tobacco, too, showed better results where this natural marine potash mineral was used. KAYLORITE means improved crops—and lasting effects.

80-100 blossoms, full of seeds

here's why you can expect better results

IT'S PROCESSED

The KAYLORITE CORP. has been working and experimenting with this natural marine product for twelve years. Now they are ready to offer it to you in the form that will insure best results. It's pulverized to liberate all the minerals and make them more readily available to the plant. KAYLORITE is so finely ground that more than 50% will pass through a 150 mesh screen. It offers 1,000 times more surface area for soil acids and bacteria to work on than is offered by unground green sand. THE KAYLORITE CORPORATION also removes the quartz and other elements that offer no benefits to your soil. When you buy KAYLORITE, you get the most of the best.

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KAYLORITE is a natural product. It is green sand marl—a mineral deposit. These deposits are protected by a 40-50 feet overburden of soil that has sealed in the nutrients—preventing them from leaching out during the thousands of years that have elapsed since their formation.

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The value of KAYLORITE has been proved in the twelve years that this corporation has been experimenting to bring you the best. A mechanical as well as chemical soil builder, it has been used at U. S. Agricultural Experimental Station with top results on tobacco. Also on follow crops of wheat and clover. Others report outstanding results when used on vegetable crops, pastures, lawns greenhouses, fruit and nut orchards. KAYLORITE can be applied with ordinary fertilizer equipment any time of the year. For further information and prices, write to KAYLORITE Corporation, Dunkirk, Calvert County, Maryland.

KAYLORITE CORP. DUNKIRK, CALVERT COUNTY MARYLAND

September, 1950

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Farming Without Chemicals

Read about an organic goat dairy on page 29.

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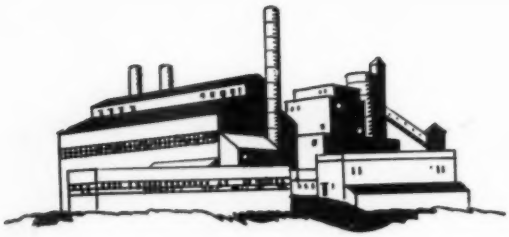

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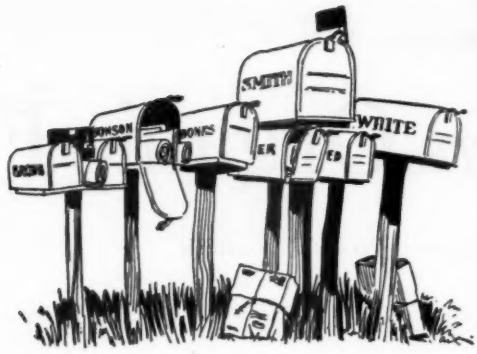

Sheet Composting Versus Heaps

Dear Sir:

There appears to me to be a danger of controversy between the advocates of sheet composting and heap or pit compost making.

But surely these methods are complementary and not opposed.

What is our aim? As I see it, we are trying to obtain the optimum quantity of healthy human foodstuffs per acre per annum, while we at the same time maintain or even increase the fertility of the soil.

That quantity of food is removed – exported – from the soil, and the soil must be paid back.

Exports can only be paid for by imports. (This is an axiom, in spite of the efforts to avoid it on the part of the financial "wizards" of every civilized country.)

These "imports" can only come from the atmosphere, from the subsoil, or by being brought by animal agency from somewhere outside the particular acre with which we are dealing.

In the case of sheet composting and green manuring only the first two operate. The atmosphere is inexhaustible, but the available elements of the subsoil get used up gradually to a greater and greater depth. And in some places the solid rock is very near the surface. So to avoid exhaustion man has to import the balance.

Also there is the question of time. The green manure needs time to grow, and our various helpers need time to convert the green crop into plant food.

It appears to me therefore but common sense that the farmer should add compost to the green crop.

Some of that compost should be "completely manufactured" or "finished" so as to provide immediate food to the new crop.

And to avoid robbing one part of the farm to pay another the compost should contain as much imported material as possible – weeds from headlands and roadsides, town sewage, sludge, peat, seaweed (if near at hand, as here), leaf mold and kitchen garbage.

Strict accountancy is not possible, but it is a fallacy to think that a green manure crop by itself will put back everything that the soil has lost through cropping.

Major Humphrey Swan,
Cornwall, England

We agree that green manure alone is not sufficient – we have said that many times. Fertilizer, in the form of ground rocks and waste organic materials, must be brought in from outside the farm to replace that which is taken off it. But we do think that it is not necessary or desirable to make compost in heaps. Much valuable plant food is oxidized and lost in an effort to make the organic matter immediately available as plant food.

Many crimes against the soil have been committed in the name of quick acting fertilizers. The soil was constructed slowly and should be fertilized so. Green manure crops and sheet compost can easily be utilized on land that is not needed for production for a few months. Mulches can be used more often and with sometimes spectacular results. The fertility so gained will not run away with the first rain, so there is really no need to worry about shot-in-the-arm stimulation.

One of the first rules to follow in handling organic fertilizers, especially manure, is to get it surrounded by particles of soil as quickly as possible. All the beneficial by-products produced by the decaying organic matter will then be utilized by the soil and not dissipated into the air.

What About The Ag. Colleges?

Dear Sir:

I read with interest the July and August issues of *The Organic Farmer*, and it somewhat amazes me that our agricultural colleges do not put out more information as to the value of organic fertilizers for farming as compared with chemical fertilizers.

J. B. McCrary,
Atlanta, Georgia

Strawberries Just Like The Catalog

Say, I wish you could have been here and seen our organic strawberry patch. I put an ad in the paper, "For Sale, Organically Grown Strawberries." The same afternoon a retired banker saw my ad and said he was going out right away to see that patch. You should have seen him and heard him. He said he never saw anything like it, so full of the largest berries he had ever seen, and the wonderful, real old-fashioned strawberry flavor. He has known this farm longer than I have, and how awfully poor it was before

we came here. The next day we picked over 24 crates off this less than one-half-acre patch. Then Friday evening, before we were finished picking some Illinois people and the head man from our local nursery came to see the berries.

He said the same as the banker, and this nursery man said he has seen pictures of berries like these in catalogs already, but he never saw real berries that looked like the pictures. He picked a quart to take home and show his wife and to compare with ordinary berries. I told him to pick at another spot where they are nicer and bigger and he said, "Never mind, these are good enough."

Then on Saturday I took four crates and drove into town close to the square. I asked a man if he wanted to buy some small strawberries or at least to come over and look at them. When he saw them he called others by name (loud too, so they could hear him a block away) to come to see these berries. They all asked where they were grown, such "little midgets." Then I said, "Oh over that way on that old worn out farm," and said they were organically grown.

Then it spread fast. By Saturday evening college students, professors, a high school chemist and others wanted to know more about this "organic method" and came out to see the patch. All alike said they'd never seen the like and wanted to know where and when this method started.

The above is a letter to Moses J. Troyer of Millersburg, Indiana, from his brother.

An Automatic Mulcher

Dear Sir:

Perhaps this idea is an old one in your circle. If so, I write to give you a little nudge.

Your new emphasis on sheet composting and upon successive mulch applications suggests to me, as it doubtless does to many others, the need for a machine to mow heavy stands of corn, clover, grass or weeds and chop or shred it and spread it back on the land in condition for rapid composting and bacterial action.

In the Spring 1950 issue of *The Land,* Charles S. Becker writes of his experience with disced-in Sudan grass, rye, etc., in line with the ideas expressed in Faulkner's book, *Plow man's Folly.*

This article in *The Land* is right down your alley with regard to the new surface composting procedure.

Now, here in the Deep South the vegetation becomes almost unmanageable about June 1 to 15. By fall it is hard to put under with a plow and can be disced only with large tractors. Even then, the roughage is not cut fine enough to decay quickly. A machine that would fine-cut this material would be most valuable here. The small planter who is without the benefit of heavy machinery resorts to burning off the growth, once it is dead and dry, in preparation for plowing and discing.

Machines like the one suggested made for light and heavy tractors

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How compost farming has enabled the crowded Orient to keep its lands fertile. 384 pp., 209 photos. **$4.00.**

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THE PRUNING BOOK

by Gustave L. Wittrock

Deals with all kinds of shrubs and trees; tells not only *how* to prune, but *when*. 166 pp., diagrams, photos. **$3.00.**

could serve very essential purposes. In the Gulf area and others where the rainfall is very heavy over brief periods of hours or days, the mulched surface would seem to be the answer to serious leaching, loss of fertility and erosion.

You are in a position to speak effectively, or perhaps to supply the initiative for manufacture of the kind of cutting machines needed. I think their emergence and use are inevitable, and soon.

Sheppard O. Smith,
Mobile, Alabama

There are many types of stalk cutters, "roto-beaters" and forage choppers on the market, some of which, it seems to us, perform in the manner you describe. The stalk cutters in particular were designed with protection from the corn borer in mind, but they make excellent sheet composters. John Deere makes one, as does the John Beane company and many others.

A Compromise

Dear Sir:

I wish to compliment you on the June issue of *The Organic Farmer* which just came to hand. I am especially pleased to note the diversity and good balance of the articles presented, and their authorships.

I am much interested to learn that the Soil and Health Foundation is undertaking to carry out experiments along the lines suggested in the letter sent you by Mr. Christopher O. Flanagan of Hamburg, New Jersey. Every state agricultural experiment station should do likewise!

I have been carrying on such experiments for 50 years on my farm in Hawaii. Although an advocate of the use of organic matter to the fullest extent possible, I have used large quantities of concentrated chemical fertilizers, with and without supplementary organic matter. I believe in the use of both *when used rationally.*

Frederick G. Kraus,
Honolulu, Hawaii

Queries and Comment

Raising Earthworms To Feed Chickens

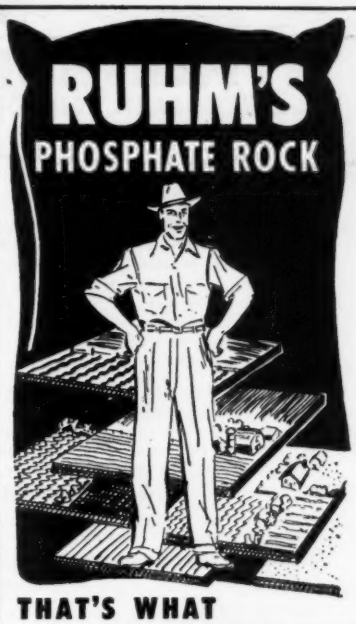
Dear Sir:

I am interested in raising earthworms as feed for chickens. Can I place the earthworm box in the poultry house? I have no other place to keep it during the winter.

Also, can I use poultry manure and straw as feed for the earthworms?

Raymond Kolb
Mentor, Minnesota

Your earthworm box can be kept in the chicken house, but protect it so the birds can't scratch around in it. Poultry manure and straw can be used as feeding material for your earthworms, but it would be a good idea to also include some



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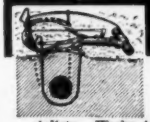

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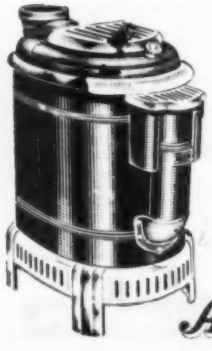

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Dept. R-1, Box 868, Columbia, S. C.

earth and cow manure in the mixture.

How To Handle Poultry Manure

Dear Sir:

Please let me know if I would receive more value from poultry manure by spreading it on the land when crops are cleared or if it would be better to pile it and let it compost before spreading.

Donald Vickery
Columbia Cross Roads, Pa.

To get the most value from poultry manure, spread it right on the land and disc or plow it in. But be careful not to plant a crop in that field for a few months at least.

Getting Rid Of Wild Onions

Dear Sir:

Would you tell me how to get rid of wild onion? The field is now in young clover. The wheat has just been threshed and wild onion is scattered over a 25 acre field.

Ruth E. White,
Carthage, Indiana

Probably the reason you are having so much trouble with the wild onion in your clover is that it grows best in a neutral or slightly alkaline soil, which is similar to the requirements for good clover. The best method I can suggest to you is to apply heavy amounts of phosphate and potash rocks to the clover. Clover, when well fertilized, forms a very close mat over the ground that will choke out weeds and wild onion.

Renovating an Old Orchard

Dear Sir:

We have recently purchased a farm, and on this farm is an old apple orchard covered with heavy sod. The trees are badly in need of pruning. The fruit is small, mostly wormy and knotty. Could you enlighten me as to the best steps to take to bring this orchard to such condition as the fruit will be of good

quality. The apples have good flavor and cooking quality.

Cecil L. Stump
Warsaw, Indiana

Chances are that if your trees are old and in the condition you say, it would be a good thing to chop them down and start over with young trees. But if you have an attachment for these trees and don't want to part with them you probably can improve the quality of the fruit by mulching them with manure and any available organic materials. You might also apply some phosphate rock, lime and greensand if necessary. Of course, a good pruning would be helpful too.

Fruit Mulch

Dear Sir:

I farm thirty acres of apples and pears and feel the need of changing my practices. I have access to several hundred tons of cull apples and pears, and also considerable green sawdust from a saw mill nearby. Can those two materials be combined for compost?

Harris Higgins
Parkdale, Oregon

Yes, but you should add lime as the materials you have available are acid. It would be best to use those materials as sheet compost or as a mulch. That way you will get the most benefit from them.

Where to Buy Organic Food

Dear Sir:

Though I do not have a farm or even a half-acre of land, I do enjoy reading your *Organic Farmer* — every page of it. I have no place this year for a vegetable garden, so I would like to know the nearest place I might purchase organically grown vegetables, fruit and wheat.

Miss Charity Sarvis,
Colorado Springs, Colorado

Your best bet would be to send in 25c for a copy of The Organic Directory, which lists many producers of organic food. It will be off the press in a week or two.

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With the Editor

By J. I. Rodale

The Downfall of Nations

IN THIS department I am doing an unusual thing this month. I am taking a portion from a novel that I am writing and presenting it herewith because it gives a theory for the downfall of the Hebrew nation due to degeneration of the fertility of the soil. The facts are right in the Bible if you will go back and study them. My novel will not be completed for at least another two years. This excerpt is from the first draft and will receive polishing later.

The narrator, who writes in the first person, is a Hebrew who lived at the time of the Babylonian Captivity, about 440 B.C. There is more to the story than what this narrator says, but I cannot have him say more because all was not known at this period. I can add that the Hebrews, like all the other civilizations contemporary with them, burned manure as a fuel in violation of the law of return, depriving the land of badly needed organic matter. Furthermore, the wanton denudation of the forests resulted in the growing of food that did not give full sustenance and eventually led to their downfall. (It is interesting to note that the Jews in Israel today are planning to plant 10 billion trees within the next ten years.)

Here is the excerpt from my novel:

Since the time of David more than five hundred years ago, Israel had gradually diminished in vigor, and it seems that the more she became weakened, the more wars she lost, and the more wars she lost the more it became the fashion to take extra wives, which in itself reduced their vigor even more, so that eventually the Hebrew nation fell easy prey under the arms of the Babylonians. But in the time of David there was lusty strength in Israel. The people then were so hardy that if there had been a Nebuchadnezzar he would have beaten against the walls of of Jerusalem in vain. In fact he would never have come anywhere near its walls, for David would have engaged him in battle long before he came anywhere near Jerusalem. Wars had depopulated the land and decimated the ranks of the men, but that was not the only thing to account for the extraordinary weakness of the Hebrew nation and its eventual downfall.

Once I heard a theory expounded by an intelligent scribe whom I met in the library attached to the temple of Marduk, in Babylon, who attempted to account for the weakness of the Hebrews. Sometimes there is more than one reason underlying the story of the ruin of a nation, the Babylonian scribe had said, although in the case of Babylonia it was mainly because the country had become too wealthy. The people became physically weakened by an excess of luxury and a dependence on slaves to do all work. They hired outsiders to do their fighting for them. But with the Hebrews it was altogether different. The scribe believed that the Hebrews had antagonized the gods of fertility in the time of David and caused the food produced in that land to become inferior so that it did not nourish the peoples' bodies properly. King David had provoked the gods of the land who have to do with causing plants to grow. He did not make the proper sacrifices to them in the beginning of the planting season. He had affronted them by praying to Yahveh for the multiplication of the crops. Let me give you an idea, the scribe had said, of the history of the Hebrews in the land of Canaan as it relates to the use of the land for the production of their food.

In the beginning when the Hebrews came to Canaan the land ran with milk and honey. It was a land of virgin, magnificent forests and luxuriant fields and meadows. Crops were so fabulous that it was nothing for a blade of wheat to be two fingers wide, and the grains of it were said to be as large as the kidneys of an ox. The quality of the food was of the highest. The gods who looked after the well-being of the soil were in good spirit and made the land

yield in flowing abundance. But one thing was extremely important to these gods. They were jealous of the forests that grew on the high places where the shrines to their worship were located. These forests were part of their souls. Through them they drank their water which came through the rains. Through them they received the worship of the people. A tree is peculiarly sacred to these land gods of fertility and must not be violated.

About four hundred years before David, Joshua and the little band of Hebrews that he took over from Moses came into the land of Canaan. Joshua gave lands and portions to his twelve tribes. To Ephraim and Manasseh he said, "The mountain shall be thine, for it is a wood, and thou shalt cut it down." Fortunately there was so much woodland that the little cutting of trees did not amount to much and seemingly did not anger the gods of the soil. There was still left more than enough trees for them to drink through. The Hebrews must have been very hardy in those days, which were full of giants and strong men, including Samson. Then came David whose soldiers had the strength to conquer everything in sight. They subdued and subjugated the Philistines. They conquered the Edomites, the Moabites and the Ammonites. Even the powerful Hiram of Tyre made a league of peace with David. Those were glorious times for the Hebrews. The land was full of rich forests. There must have been woodland all over the country for when Absalom revolted from David his father and rode through a forest in the middle of a battle, his hair caught in the branches of an oak tree and he was left hanging there while his mule got away from under him. Joab, the commander of David's armies, was told of it, came there in person and slew Absalom.

Drawing by Ronald Clyne

King Solomon

But David makes one unforgivable mistake. He ignores the gods of the soil and petitions directly to Yahveh to give them rain and abundance in crops. Yahveh gives it to him, but the enmity of the other gods is incurred. David commits another error. It grieves him to see his people worshipping idols under the trees at the high places and he commands many of them to be cut down. This is a direct, brazen affront to the idols who plot to bring calamity upon the Hebrews. But Solomon, the son of David, is even worse than his father. Because of his critical need for money to build palaces and to furnish luxuries to his many wives he is the first Hebrew King to engage in the shipping trade. He chooses the kind of merchandise to trade in which presents the least problem — wood. He cuts down many forests. Solomon had four score thousand hewers of wood in the mountains for many years hewing and cutting down trees continuously to satisfy his greedy desire for money. Eighty thousand men — that is a staggering number of men. They mowed down practically all the worth-while trees and forests in the land. Solomon forced his people

With the Editor

Continued

into the ranks of the wood-cutters and palace builders. It was a very unpopular thing for we know that Adoniram, his overseer, was stoned to death by the incensed people.

Where is the forest of Hereth where David hid today? It is gone. Where is the forest of Bethel that used to shelter bears? It is gone. There is not a single forest in Kirjath-Jearim, a name that denotes "city of forests." Where are the woods of Sharon which once covered the land from the valley of Ajalon to Mount Carmel? This irreligious despoliation not only made the gods wroth but eventually caused the land to become barren, for the gods drank their water through the roots of forest trees. The ground became parched and the gods sent mildew and locusts and caterpillars to consume the fruit of the land. The pasture withered and the fig tree lost its sweetness. The flax and the barley were smitten. Out of the earth came little bread.

The people in the time of Solomon's son, Rehoboam, were already so lacking in strength that civil war embraced them and the nation broke into two parts — the ten northern tribes standing against Judah and Benjamin. The spirit and the vigor of the people kept degenerating and for the most part after Rehoboam we hear of the land of Israel being overrun by foreign conquerors. The Hebrews were constantly under tribute to the nations that surrounded them. First it was Egypt in the time of Rehoboam. Then came the Syrians. Gradually Moab and Edom, who were under tribute to Israel, succeed in delivering themselves from its domination. There come wicked kings who rule the land with sword, rapine and unspeakable brutality. There comes civil war again between the Hebrews. Then comes the Assyrian domination under Tiglath Pileser. Shal-maneser the Assyrian, takes the ten northern tribes and carries them away as captives to Assyria, never to return homeward. They intermarry and completely lose their identity. No longer are they Hebrews. The remnant of the Israelites that are now in Babylonia are only of the tribes of Judah and Benjamin, with a sprinkling of Levites. Then comes Senacherib who levies tribute on the Hebrews who have remained in Palestine.

By the time of Ezekiel the land has become so debilitated that the pastures are painfully few and the cattle close to the vanishing point. There was not sufficient animal dung which was necessary as a fuel for the baking of bread. When your Yahveh spoke to the prophet Ezekiel he said that because the people had turned their backs from following Him, they would be reduced to baking their bread with human dung. At this stage in Israel's history the hunger of the land must have been beyond appeasement. Thistles grew instead of wheat, and cockles instead of barley. The food of the people did not have the potency to nourish them properly. They could not win battles against soldiers who had been brought up on food that came from a soil that was favored by the gods. Finally, when Nebuchadnezzar came and carried the remainder of the Hebrews into captivity, scrub oaks, briers and thorns possessed the land right up to the walls of Jerusalem. You can see that it was the provocation of the gods that brought decay and destruction to your race. Zarathustra, our Persian law-giver, was fully aware of this aspect of life. Did he not say, "He who sows the ground with care and diligence acquires a greater stock of religious merit than he could gain by the repetition of ten thousand prayers." Zarathustra would never cut down so many forests on tops of mountains.

That is what the Babylonian scribe said.

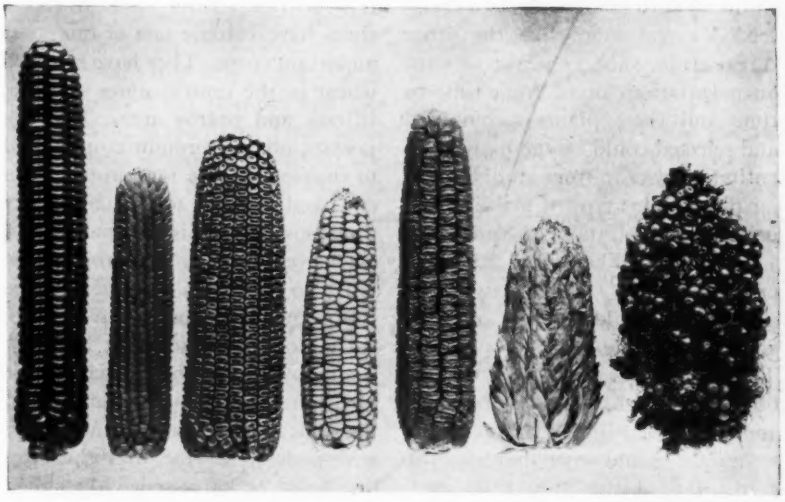
Dump Wagon

John H. Kempker, Henley, Mo., had his farm wagon built in a local shop to his own specifications which included a hinged bed. This hinged bed provides for dumping in three ways: (1) with loader arms on his farm tractor; (2) with chain hoist attached to cross frame or barn joist; (3) with pulley and cable pulled by tractor. The tractor loader is used to dump the bed in the field and the other arrangements are usually set up to suit the facilities of the unloading spot such as at the corn crib or barn.

New Crops from Old Plants

Plant pioneers make progress by glancing backwards.

By D. F. JONES
Connecticut Experiment Station



The main types of corn; from left to right: flint, pop, dent, flour, sweet, pod and branched. Branched and pod corn are closest in appearance to the "grass corn" referred to in Dr. Jones's article.

IN THE long process of converting wild plants to our present day food crops many changes have taken place. Wheat, rice, maize, oats, rye, sorghum and barley are cereals that are grown in largest quantity and are the main source of food for most of the people on this planet. They are all members of the grass family. Together with herbage crops, that are also mostly grasses, cereals are the principle source of nutriment for livestock.

Cultivated cereals differ from their wild forebears in having larger plants with larger seeds. The seeds are produced in much greater quantity and are easier to harvest from domesticated plants than from the wild. If we were dependent upon wild plants for our food supply it would be impossible to feed the present world population.

In this change from wild to cultivated varieties some undesirable alterations have occurred. When seeds are increased in size they are usually altered in composition. Since it is easier to increase the starch content than the proteins and vitamins and other important ingredients, most of our domesticated crops are less nutritious than the wild grains, even though they may have better flavor and are more easily digested.

Many people prefer the flavor and sweetness of wild strawberries, blackberries that grow in pastures and fence rows and native blueberries to the large cultivated berries. Wild rice is a delicious food that commands a high price and is usually served only in the finest restaurants.

What can be done to gain the necessary advantages of domesticated plants in their better adaptation to field culture and to machine harvesting and at the same time preserve the finer flavor and better nutritive qualities of the wild plants?

First must come an appreciation on the part of the consumer of these qualities. High quality goods usually come in small packages. The finest varieties of sweet corn have the smallest ears. In the long lists of cultivated varieties of fruits, vegetables and cereals there are varieties that are outstanding in their higher quality. The consumer must learn to appreciate these high quality varieties and be able to identify them on the market. Usually they are less attractive in appearance as well as being smaller in size. These quality varieties usually yield less and many of them are never grown for the general market. The chief advantage of growing a garden is to have the choice varieties, well grown and picked fresh when in their prime. Many people do not know how good vegetables and fruits can be until they have grown these selected varieties in their own garden. Plants must also be well grown with all the necessary nutrients added to the soil to have the finest flavor and the highest food value.

Many roadside stands and quality markets are beginning to grow some of these better varieties in localities where their customers know good things to eat and are willing to pay the slightly higher price that these lower yielding varieties must bring to justify their production.

With an intelligent demand for food with finer flavor and higher nutritive qualities there should come on the part of the plant breeders a greater interest in the development of varieties of this type.

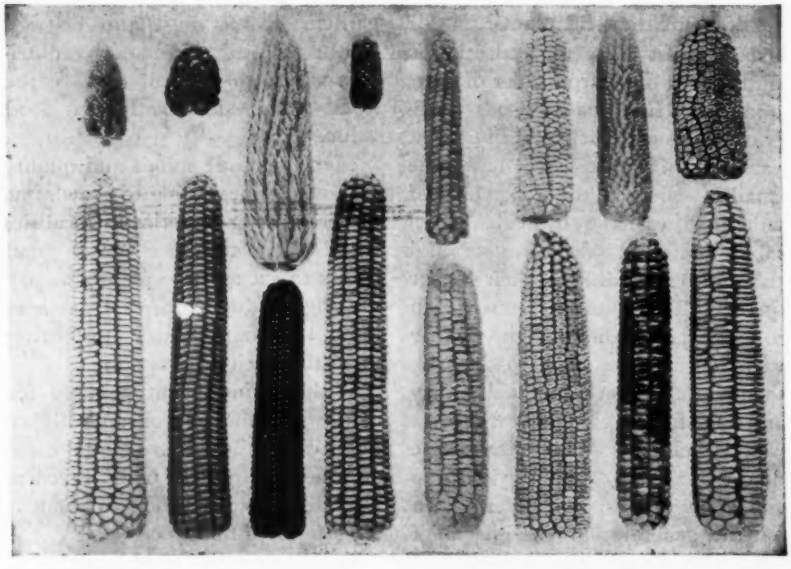
Indian corn is a good example of a plant that has been vastly changed

New Crops from Old Plants

Continued

from the wild in the direction of larger plants with larger seeds placed in compact inflorescences that are easy to harvest by hand. Now that we have machines to plant, cultivate and harvest corn it may be desirable to change this most valuable plant in the western hemisphere to a small-seeded cereal more like the other cereal crops, such as wheat or oats. Such variations occur from time to time and these plants recombined and selected could be the basis of an entirely new crop from an old familiar plant. This type of maize would have many small stalks growing from a single seed. The grains would be produced singly in the tassel and each seed would be enclosed in glumes just like most grasses are. This new type of corn might be sown broadcast just like the other cereals and harvested with a combine. This technique would save the labor of cultivation. Fields would be completely covered with a growing crop and would be less subject to erosion. The small kernels would be more like popcorn than the large seeded dent and flint corn now grown. Small seeds would have a higher proportion of embryo to endosperm and therefore have a higher percentage of protein, vitamins and minerals.

A renewed effort is now being made to search the world for new plants that can be used not only for food but for new materials in industry. Soybeans from Asia in recent times have become one of our most important crops. They have replaced wheat in the central states of Iowa, Illinois and nearby areas. This important oil and protein crop is used to supplement the low protein corn crop and helps to solve many insect problems. Sesame is now being tried extensively as a similar crop in the south to be grown on much of the cotton area. Sesame is a seed crop, native to the tropics, that has long been grown in southern Asia and the Mediterranean countries. In the past the seeds shattered so easily when the seed pods were ripe that the crop could not be harvested by machine. Plant breeders have recently developed non-shattering varieties adapted to machine harvesting and this new crop from an old plant is very promising. The oil is valuable both for food and industry and the meal after oil extraction is rich in protein and makes an excellent supplement to corn for feeding livestock.



Corn, one of the world's most important crops and a prime subject for plant experimenters, comes in all shapes and sizes. Tiny ears in upper left corner are pop corn.

It is unfortunate that our main food crops are restricted to such a few plant families. Practically all of our cereals are in the grass family. The most important sugar producer is also a grass.

While sugar is an essential food and needed in the diet, especially for young and active people, it is unfortunate that it is being used in such ever increasing amounts that it is replacing other essential foods. Pure cane and beet sugar has all of the minerals and vitamins removed in the molasses which is fed to livestock. Those who know food values use brown sugar in place of refined sugar, or better yet, honey, which is the best source of sugar. If people would spend the same amount of money for honey they now spend for sugar they would be much better fed. Honey comes from a great variety of plants and is one of the best sources of vitamins.

Next in importance are the legumes: peas, beans, soybeans, lentils, peanuts, clovers and alfalfa. The solanums, that include potatoes, tomatoes, peppers and eggplants, are important food crops. The cucurbits are important vegetable and dessert fruit crops such as pumpkin, squash, cucumbers and melons. The parsley family is valuable for the production of vitamins and minerals. The carrot is one of the best producers of vitamin A and celery is rich in calcium. Both celery and potatoes produce the most protein per acre of any crops grown. Not because they are especially rich in these ingredients, but because they produce such a large quantity of food. Peas and beans are high in protein but produce much less per acre.

Two other important families must be mentioned. The chenopods supply beets, spinach, chard. Sugar beets are an important source of sugar. The brassicas supply cabbage, cauliflower, broccoli, turnip, rutabagas and an important oil producing crop from rape seed. These leafy vegetables are rich in the protective

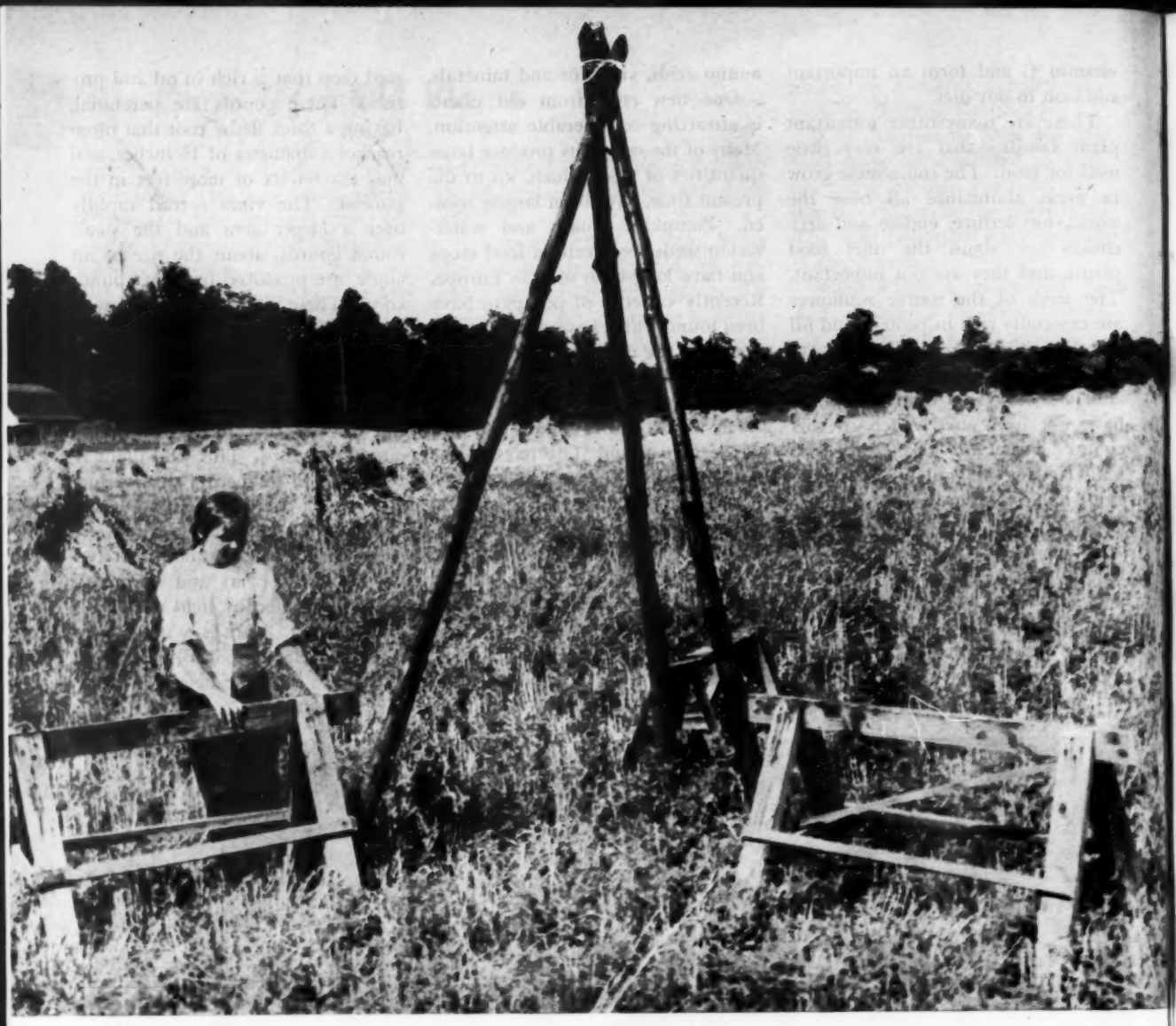
vitamin C and form an important addition to our diet.

There are many other important plant families that are very little used for food. The compositae grow in great abundance all over the world, but lettuce, endive and artichokes are about the only food plants, and they are not important. The seeds of the native sunflower are especially rich in protein and oil and the fertility vitamin K. They are extensively grown in South America and in the Soviet Union, but so far have not been used much in this country except for bird food. The plant is not well adapted for machine harvesting and so far the yield of seeds has not compared with other cereals. Millers have not learned how to use these valuable proteins. The meal left after the extraction of oil turns rancid quickly. This is unfortunate as we need a wide variety of foods from different plant families to supply all of the essential amino acids, vitamins and minerals.

One new crop from old plants is attracting considerable attention. Many of the cucurbits produce large quantities of seeds which, up to the present time, have been largely wasted. Pumpkin, squash and watermelon seeds are excellent food crops and have long been used in Europe. Recently varieties of pumpkin have been found which have seeds that are free from the usual papery covering. These seeds can be roasted in hot oil and make a delicious nut that is much softer than peanuts and has an excellent flavor. This naked seeded pumpkin is better adapted for the extraction of oil and this product is an excellent cooking and salad oil.

This naked seeded character is being transferred to a dry seeded fruit that can be threshed when mature. It is well adapted to hot, dry regions. The wild gourds that grow all over the desert regions of the southwest also produce an abundant seed crop that is rich in oil and protein. These gourds are perennial, having a thick fleshy root that often reaches a diameter of 15 inches, and may extend six or more feet in the ground. The vines spread rapidly over a larger area and the small round gourds, about the size of an apple, are produced in great abundance. These green fruits are well protected by a vile tasting substance that protects the seeds from all desert animals. The plants themselves are also immune to the common insects and diseases that plague the cultivated vine crops. This wild plant is well adapted to the dry deserts and will grow where the rainfall is inadequate to produce any other crop. When the fruit is dry the protective substance disappears and the seeds are quickly eaten by field mice and other rodents. Here is a plant that has long been overlooked that promises to be a valuable new crop from an old plant.

The standard corn plant in the center is flanked by two "grass corn" plants — an unusual variation of standard corn that may one day pay off to farmers in higher protein content and easier harvesting.



Here is the tripod harvester made by the author. The air vent constructors are common saw horses. Hay and grain farmers who don't want to risk weather losses can profitably resort to the use of this device.

Harvesting By Tripod

Make hay while it rains with a Scotch innovation.

By ALDEN STAHR

WHEN the editor of *The Organic Farmer* asked me to do an article on the Scottish method of harvesting grain and hay by tripod I was dubious about it, for I had never seen it done nor tried it myself and had seen only one reference to it. I have an old-fashioned notion that library research is no substitute for actual experience in farming.

This past summer, however, we harvested our wheat and rye by binding and threshing instead of combining and so took the opportunity of testing the tripod method in direct comparison with the ordinary method of shocking and

stacking. In addition, I sought information direct from the originator of the system, A. Proctor & Co. of Blairgowrie, Perthshire, Scotland, so, between my own try-out experience and information from headquarters I hope this account will prove adequate for those interested in learning about and trying this method of making higher-quality hay and grain.

The first reference I saw to tripod harvesting was in Friend Sykes' book, *Humus and the Farmer* (Rodale Press). In 1945, Sykes was seeking a better method of harvesting hay and grain than the traditional shocking and stacking between binding and threshing. He had considered combining but found it impracticable in the humid British climate. He had heard about the Proctor System of Tripod Harvesting but had never done anything about trying it until he saw Proctor's advertisement in a Scottish agricultural magazine.

Sykes began by ordering two hundred tripods from Proctor by phone and the latter offered to come down from Scotland to instruct Sykes' men in the proper use of the method. Here is Sykes' own account of his first trial of the tripod method:

"Under Proctor's guidance we began hay-making very late in June – normally we should have almost finished Haysel by this date but the 1945 season was the wettest in living memory in this part of Wiltshire. We cut the mixed ley in the morning, tedded it soon after cutting then swept it to the tripods, where it was assembled, and thus we put away most of what we had cut that day .... We did thirty acres, in catchy weather, when ordinary haymaking would have been quite impossible, and so pleased was I with the results that we ordered a further eight hundred tripods with which to do both the hay and the corn grain harvests.

"The weather in this part of Wiltshire was on its worst behaviour from the end of May right up to the end of September. Scarcely two consecutive days fine, we have never known such trying experiences in thirty-two years. Without the tripod system we should have been in dire despair. All our neighbours were in terrible straits. We harvested our crops between the showers and put them safely away into the tripods, where, defying the penetrating rain, they have stayed until they were ready to be threshed. And what of the condition and the quality of the crops?

"The hay is equal to that made in the Borlase Matthews system (blower cured). The animals eat it with relish, and never leave either leaf or stem. Its colour – a nice green – is preserved, so are all the leaves and the flowers. The corn (grain), however, is perhaps the greatest revelation. The straw is bright golden colour, of a feeding value I have never seen before. The quality of the grain is the finest I have ever threshed. The quantity, too, is surprisingly high, for with this system the handling is so appreciably reduced that more grain gets into the bag, and being less exposed to the sun, through no stooking, is plumper, better in quality and lustre .... We have harvested hay, corn, clover for seed and American sweet clover for seed by this method in 1945, the wettest year recorded in half a century, and the quality of our crops is the best we have ever known."

This is the comment of the man who is conceded to be the finest farmer in England.

Word from the Originator

Mr. Herbert A. Proctor, one of the partners of A. Proctor & Co., in Scotland, kindly responded to my inquiry as follows:

"Thank you for your letter of the 9th inst. and we are interested to hear that *The Organic Farmer* magazine in America wishes to publish an article on our system of harvesting.

"We agree with you that it is essential to have some sort of information on the subject before compiling an article, otherwise it is just a case of the blind leading the blind.

"The whole principle of tripod hay-making is of course to dry the grass by air rather than by wilting in the sun, and thus retain the green

The Proctor hay curing tripod and air vent constructors, manufactured in Scotland.

Two Englishmen constructing a hut. The air vent constructors can be seen protruding from the sides of the half-completed hut.

The finished hut. Rain just bounces off this ingenious stack — the poor man's forced air dryer.

Tripoding grain in England. The butt ends facing out protect the grain inside from weather damage.

Harvesting By Tripod

Continued

colour and leaf on the crop, and by so doing increase its feeding value by at least three times that of normal hay. It is in fact a compromise between hay-making and artificial grass drying, and the results which have been obtained in this country often better than obtained by artificial drying.

"Our system is particularly advantageous for leafy crops, such as Lucerne (alfalfa), Sanfoin and Clover hay, as by normal methods, half the leaf of these crops is left laying on the field, and usually it is only the stalk which eventually reaches the animal.

"For efficient tripoding, the following implements are very desirable – a Hay Tedder, a Tractor Hay Sweep, and of course the Tripod Equipment. Over here it is usually a case of cutting the crop one day after the dew is off it, tedding it that afternoon and possibly again the next morning and tripoding it the afternoon of the day after cutting, so that the crop is actually laying on the ground for approximately 24 hours. Under favourably windy conditions, it is often possible to tripod on the day of cutting, but it is always desirable to err on the safe side when new to the system, as there is no doubt that tripoding if wrongly done can do more harm to a crop than good.

"The two secrets of successful tripoding are to know how to build the crop on the tripod, and in what condition the crop can be put on the tripod. Both of these are very difficult to explain in writing, and it is our practice over here for us to give practical instruction to all new users of our equipment so that its success is ensured right from the start.

"You will see from the enclosed literature what really high protein analyses can be obtained, and to our mind, one ton of tripoded hay is worth at least three of that made by other methods, i.e., pick-up baling or stacking in the field."

Completed hut. Boy is holding saw horse used to form air intake.

Description

The main object of the Tripod Harvesting System is to provide a simple and economical method of harvesting, which, without incurring heavy capital outlay and without disturbing farming routine, will produce high quality results, and at the same time eliminate weather risks.

The high cost of feeding stuffs makes it essential for farmers to eliminate the gamble with the weather which occurs every year at hay and harvest time. The Tripod Harvesting System will secure even in a difficut season hay with a feeding value equal to artificially drying grass, grain, peas, beans and seeds with a uniformity of colour and quality unobtainable by any other method of harvesting.

Weatherproof tripod harvesting is becoming increasingly popular in all parts of England and the views of many prominent farmers fully substantiate Proctor's claims. The protein analyses of tripoded hay will be of particular interest to farmers when compared with the results obtained by artificial drying plants throughout the country last year, when the average protein content was approximately 13 per cent and the drying cost almost 45 dollars per ton.

Directions

Hay: – The crop is cut in such sections as can be tripoded the day of cutting, or the following day, depending on weather conditions, and at no time should there be any large acreage of crop laying at the mercy of the weather. Approximately 8 to 10 tripods are required per acre, and a squad of two men should tripod three to four acres per day. Once the hay is on the tripods it is perfectly safe from the weather, and will be ready for stacking or baling in two to three weeks, retaining its colour and leaf to a remarkable degree.

Grain and Beans: — Approximately 8 to 10 tripods are required per acre for an average grain crop, and from 80 to 120 sheaves are built around each tripod, making a weatherproof ventilated hut. Tripoding can be done behind the binder, and takes little longer than stooking or shocking. Once the sheaves are secured in the tripod huts, there is no further handling until stacking or threshing, and no amount of bad weather can harm the grain or the straw to any degree. Shedding is practically eliminated, and up to 25 per cent increase in weight may be expected. With oats, when weather is settled and fine, it is often advantageous to leave the sheaves on the ground for a day or so to wilt slightly before tripoding. Under average conditions, tripoded grain should be ready to stack or thresh about three weeks after tripoding, but if well topped and tied down, can be left with safety in the tripod huts for a few months, if necessary.

Peas: — The same technique is used as for hay. The size of hut is varied according to how soon the peas are tripoded after cutting, but on an average 10 to 12 tripods are required per acre. Particularly good results have been achieved with this crop, and during the 1948 season, many crops were saved from complete destruction.

Seeds: — All types of seeds can be tripoded with ease and certainty, ensuring a uniform high quality and colour, which is so important with these crops.

Instructions: — In England and Scotland, Proctors send a skilled instructor to work with the new purchaser at haying or harvest time to ensure most advantageous use of the tripods.

Cost: — In England, the cost is 50 pounds per 100 tripods F.O.R. (free on rail, I assume) including air vent constructors. This is roughly $150 per 100.

Sweeps: — Proctors recommend the use of a hay sweep for gathering the material in the field, which is converted for bringing the tripod huts intact to baler or thresher. This machine is similar to the hydraulic buck rake on the Ford and other tractors in this country. They also suggest the use of a tedder for kicking up the hay after it has been cut.

Making the base of the hut.

Analyses

The British government looked into tripod harvesting and here is the report submitted to the Ministry of Agriculture after inspection of the system in operation at the Rogers Farm, Horton Kirby, Kent:

"We saw a 20-acre field from which lucerne (alfalfa) had been cut and hutted on Proctor's Patent Tripods.

"The lucerne had been cut on the 28th of September and put on to the tripods on the 29th and 30th of September. It had, therefore, been drying on the tripods for 18 days.

"Mr. Proctor thought that the tripod huts had been made about one-third less than their proper size, the thickness of the lucerne on the tripods being only about two feet average, whereas from his experience the thickness should be about two feet at the base and three feet from the frame toward the tops.

"The effect of having insufficient bulk means having a greater surface area exposed to rain, etc., in relation to the total amount of fodder on the tripod, which also means an excessive number of tripods in use, besides delaying collection of the crop from the fields by his special lifting machine.

"The lucerne had retained its green colour to a marked degree in spite of the fact that it had rained excessively (5½ inches rainfall) during the previous week.

"The tripod huts were dry except for a section on the outsides of the northern sides, which had got neither wind nor sun after the torrential rains, and over the area of this part the grass was still wet and somewhat spoiled on the outsides.

(*Continued on page 59*)

APF—No Substitute for Good Management

Much research must be done before we will know the whole story about the "miracle" growth stimulants.

By JEANNE PONTIUS RINDGE

RECENT news releases have made extravagant claims regarding the livestock growth stimulating capacity of APF (the so-called animal protein factor), recently-discovered vitamin B_{12}, and even the antibiotics. The implication is that a pinch of magic may supplant good management in the growing of "super-animals."

At best, the whole problem of animal protein factor is confusing because so many pieces of the jigsaw puzzle still are missing. Gradually — through the concentrated effort of university professors and researchers, government scientists, and commercial researchers — the picture is taking shape, but much more time must elapse before it can be said, with confidence, "here is the story."

In the meantime, we can pick up the pieces as they are discovered, and make the best possible use of them.

Scientists working most closely with the new discoveries in growth factors are far more cautious than the news reporters. News-published statistics are, in most cases, laboratory statistics specifically controlled to uncover the nature of these new discoveries in animal nutrition. A different set of statistics probably will develop on the testing ground of the farmyard, according to some researchers.

There is no substitute for good management, these scientists will tell you. This fact in no way detracts, however, from the importance of the new advances in nutritional knowledge.

It is well to state immediately that the so-called APF supplements are not an "invention." Nature has provided its components all along. We now are learning what they are, why they are necessary, and how their quantity can be stepped up in various ways.

For years it had been known that animal proteins possessed a growth factor which was not found in plant proteins alone. Dr. Mangold of Germany told the World's Poultry Congress in Cleveland 11 years ago that "to obtain a high standard of production in the poultry industry, we cannot afford to dispense with some protein of animal origin, because this is of greater biological value than all proteins of plants."

In recent years this much advance has been made — the protein of soybean meal has been found to be only a very little inferior in biological value to animal protein; previously unknown dietary factors in animal proteins have been revealed, and one — vitamin B_{12} has been isolated; and it is now believed that soybean meal, calcium phosphate and vitamin B_{12} can replace animal protein supplements in some — but not all — diets. It is believed, also, that other unnamed factors in animal protein still remain to be isolated and are needed in certain restricted formulas.

Such knowledge might not have been too significant years ago when animal proteins were easily available and were added in large quantities to poultry rations. With todays scarcities, however, more and more plant proteins are being used with less of the expensive meat scraps, fish meal and tankage.

Synthetics Are Cheaper

Conservatively, the most significant result of the present dicoveries may be the successful addition of cheaper APF supplements to pig and poultry rations to replace at least some of the scarce and expensive animal proteins. Although formulas already are in use and feeds with such supplements added are on the market, they cannot be considered fully accurate until all factors in APF have been identified.

Aside from this, good farm management may prove to have as successful results as increased shots-in-the-arm of vitamin B_{12} or APF (The use of antibiotics such as aureomycin, streptomycin and terramycin is such a radical departure — "medication, actually, rather than feeding" — that reputable scientists such as Dr. Leo C. Norris of Cornell refuse to make predictions about it until a great deal more is known).

It is well for the farmer to know the background of the present APF discoveries and advances. Your chicks and turkey poults require the factor for survival and early growth. Hens need it for the production of hatchable eggs and for the production of vigorous chicks. Pigs require it for growth and efficient utilization of feed. This factor (or factors) has the remarkable tendency to be carried over from the mother to her progeny through the egg or the fetus.

Cattle and sheep require it also, but microorganisms in the first stomach, or rumen, manufacture the animal protein factor in much the same way the factor now is produced industrially through the use of molds. Proper feeding of cattle, one set of experiments has found, will step up the quantity of vitamin B_{12}, at least, in the supply of milk.

The natural carriers of the animal protein factor are fish meal, fish solubles, meat scraps, and liver meal. Vitamin B_{12} has been found in significant quantities in dried cow manure, and in built-up chicken litter. Here, also, microorganisms at work are responsible. Chickens grown on built-up litter and chickens and pigs allowed to run on cow manure — as grandpa permitted them to do — obtain a natural source of this important vitamin. Alfalfa is thought to contain small amounts of this factor — and also the soil, itself. Chicks on range are found to need less supplement than do poults on wire.

B12 Is Most Important

The name animal protein factor, or APF, also is misleading. Dr. H. R. Bird of the U. S. Dept. of Agriculture Station at Beltsville would prefer to call it vitamin B_{12} Supplements, because the B_{12} vitamin, while not the only factor, is, he believes, the most important factor. "The justification," he says, "lies in the fact that a severely restricted or purified diet must be used to produce a deficiency of the still-unknown factors, whereas, before the recent development of vitamin B_{12} concentrates, a B_{12} deficient diet could be made simply by omitting the fish and meat products from any practical feed."

N. R. Ellis, in charge of animal nutrition investigations also considers APF supplements a dubious term. "It can be stated," according to Mrs. Ellis, "that vitamin B_{12} is the only factor of the APF that has been isolated in pure form unless one includes aureomycin. Demonstration of the effect of aureomycin on growth would seem to place an additional question mark on the use of the term APF, which was already a rather dubious term anyway."

"It appears now that the extra growth stimulating effect of some of the commercial so-called APF supplements is due entirely to aureomycin or some other antibiotic and not due to unknown vitamins. There is still evidence, however, for the existence of unknown vitamins in such materials as whey, fish solubles and fish meal. These might be grouped with B_{12} and referred to as APF, but there would appear to be very little point in doing so."

Until agreement on a new name is reached, the term APF supplement will continue to be used. How the supplement was found, and what to do about it, is — in the long run — important.

In 1936 Beltsville researchers said that a "new factor, not vitamin G, necessary for hatchability of eggs" is present in certain feedstuffs such as pork liver. Hatchability was not increased by adding dried whey or soybean oil meal as protein supplements.

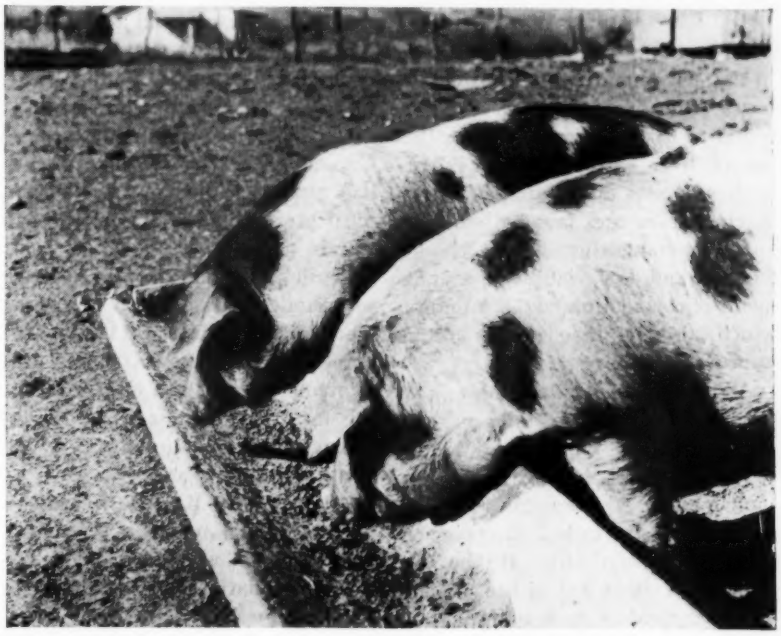
Vegetable Protein Alone Is Not Enough

Scientists already had established that poultry diets containing soybean meal as the only source of protein were deficient in a hatchability-promoting or growth-promoting factor which they knew to be associated with certain animal proteins.

In 1944 sardine meal at the level of 2 per cent had a marked supplementary growth effect when added to chick rations containing soybean meal protein.

Then, in 1945, Whitson, Hammond, Titus and Bird noted that 8 per cent cow manure supplements promoted growth under conditions in which 2 per cent sardine meal also was effective. Hammond had previously reported that dried cow manure and dried rumen contents had vitamin activity if added to a diet deficient in riboflavin. These results demonstrated a factor in cow manure in addition to riboflavin. For a time this strange new factor was called the "cow manure factor."

Now reports were coming in from many experiment stations that such supplements as condensed fish solubles, fish viscera, whole liver powder, dried rumen contents and dried cow manure contained a factor which improved growth and hatch-



If your feeding program is sound, chances are you will not have to resort to the use of synthetic forms of the new "miracle factors."

No Substitute for Good Management *Continued*

ability in chickens receiving an all vegetable ration, complete in other recognized growth essentials. It was at this time that the term "animal protein factor" came into use.

Supplements Similar To Liver Extract

Beltsville workers now succeeded in extracting and concentrating the factor from cow manure. It was found to have the same effect as the use of liver extract. During these studies, it was observed that chicks hatched from eggs laid by hens fed an all-vegetable diet showed kidney damage and low viability. Supplements of cow manure and skim milk, which also improved hatchability, improved viability.

Adding these supplements to the chick's diet, however did not stop the death losses. This weakness, indicated, and it was later verified, that the mothers, themselves, required this factor in order to produce chicks which would live. It then was found that hens fed either 10 per cent fish meal or cow manure concentrate for 6 weeks, stored sufficient amounts of the factor to insure high hatchability for 12 to 15 weeks after the hens were again placed on deficient diets. When the factor was given to deficient hens, hatchability jumped rapidly within 12 to 18 days.

By 1946 the strangely powerful factor was discovered in hen droppings by Beltsville scientists. When the frozen droppings were added to diets of deficient chicks, however poor weight gains and low viability was the result. When the droppings were incubated at 30 degrees the chicks picked up weight and fewer died. This seemed proof positive that the factor was formed in the hen droppings through the action of microorganisms after they left the hens.

The unidentified "hatchability factor" now was found to be most active when a built-up litter program was followed. In 1949 investigators at the Idaho Experiment Station reported that hens on a soybean meal diet maintained a high level of hatchability when kept in open pens but that normal hatchability was not supported in wire floor laying batteries.

Five per cent dried cow manure supplement was found to be effective when added to an all-vegetable-protein diet of turkey poults during the early stages of growth (up to 24 weeks). Scott, Norris and Heuser of Cornell found that the addition of fish meal to a diet high in soybean meal greatly increased early growth rate in turkeys.

While the poultry experiments were under way, research was going on to isolate the factor in liver which prevented pernicious anemia in human beings. It was suspected that this factor was similar, if not identical to the animal protein factor in poultry feeds.

B12 Vastly More Powerful Than Liver

In 1947 Lederle Laboratories discovered a bacterial type of microorganism in hen feces which formed the factor by aerobic fermentation of material containing little or no animal protein factor in its original ingredients. This fermentation material was concentrated and refined and it was announced in July, 1948 that the same concentrate was active in the treatment of pernicious anemia in man.

In 1948, also, announcement came independently from both the U.S. and England that small quantities of a red crystalline compound—called vitamin B_{12} or the antipernicious anemia factor — had been isolated from liver extract. 1/150,000,000 of a pound of the crystals was found to be a million times more potent than the 10 to 15 grams of liver which was the daily treatment of thousands of anemia sufferers.

The new vitamin was found to contain cobalt, which opens a new field of research in the role of cobalt in nutrition, although to date there has been no published evidence that cobalt deficiency in cattle has been relieved by use of vitamin B_{12}.

The new vitamin was found to stimulate growth in chicks deficient in the animal protein factor. Seriously deficient chicks, however, appeared to require some factor in addition to B_{12} for maximum growth. This indicated that B_{12} and APF were not identical but that the vitamin was the most important factor of it.

Late in 1948 Rickes and his coworkers isolated microorganisms from the soil which produced vitamin B_{12} when grown in pure culture. Lederle Laboratories have found the organism S. aureofaciens, which produces aureomycin, to be an excellent producer of the animal protein factor. Fermentation products made from this organism have been shown to contain a second and unidentified growth factor in addition to B_{12}, Lederle researchers say.

Under laboratory conditions these products have given remarkable weight gains to chicks and pigs *deficient in animal protein factor.* Here is the highly controversial aspect of this whole APF supplement question. Magazine articles and news stories give the statistics for these fantastic gains, implying that the same catapulting results can be obtained in the barnyard.

As Dr. Norris of Cornell points out, these animals and poultry have been fed restricted rations and in some instances even rations known to be deficient for laboratory purposes. Consequently, the sudden gains seem spectacular. "I am not at all certain," he says, "that any better growth can be obtained with antibiotics than we at least sometimes get through good management — using clean chicks and adequate, normal feeding."

Vitamins Versus Drugs

We now have reached an uncertain line of demarcation between the vitamins — food essentials, and the antibiotics — drugs. The microorganisms which produce the drugs are producing the APF supplements which are going into the feed bags. In some cases, the drugs themselves are being used.

"There is no evidence," Dr. Norris explains, "that an antibiotic is a nutritional element. It is more probable that the drugs kill off harmful bacteria, allowing beneficial bacteria to grow — thus giving the growth boost in the chick or pig." This would explain the unusual gains in deficient livestock, with the less spectacular results in animals not already "pulled down" by disease organisms.

Dr. Norris grants that there may be value in feeding antibiotics to Broilers reared under crowded conditions, or small pigs raised under conditions which make good sanitation difficult to maintain. He believes, however, that too much remains to be learned in this field to allow for conclusive statements at this time.

Harry W. Titus, writing in the *Eastern Feed Merchant* adds his word of caution: "The conclusion that APF and vitamin B_{12} tend to greatly increase the growth-promoting value of diets composed solely of the usual feedstuffs of plant origin should be qualified. If the chicks have sufficiently large carry-over of vitamin B_{12} (from mothers), the addition of vitamin B_{12} to their diet has little or no effect on their rate of growth or efficiency of feed utilization, at least for the first 10 or 12 weeks of life.

"And, if such chicks are raised on old litter, properly managed, the addition of vitamin B_{12} to their diet has little or no effect, even beyond the 12th week of life. On the other hand, if the chicks are from parent stock that has been on an APF-deficient diet for some time, the addition of vitamin B_{12} to the chick's diet will tend to have a rather pronounced effect on their rate of growth and efficiency of feed utilization. But, if such chicks are raised on old litter, the addition of vitamin B_{12} may have very little effect after the first 8 to 10 weeks of life."

N. R. Ellis, head of nutrition investigations at Beltsville adds, "We believe that the answer to your question as to whether chickens and hogs grown in the old-fashioned way in the barnyard provide themselves with adequate APF from cow manure, is that under most conditions they certainly would obtain adequate B_{12}. Whether they would get enough B_{12} in all seasons of the year in the northern part of the United States might be questioned."

"The need for a high concentration of this vitamin in the feed decreases during the growth period. In experiments at Beltsville pullets *on range* were not adversely affected if all vitamin B_{12} supplements were removed from their diets when they were eight weeks old. Turkeys in *slat-floored sun porches* were adversely affected if B_{12} supplements were *totally removed* when they were eight weeks old, but they were not harmed by a sharp *reduction* in vitamin B_{12} content in the diet. The difference observed between the above-mentioned pullets and turkeys is believed to have been due, not to species, but to the difference between range and confinement. Vitamin B_{12} supplements are not required in laying mashes unless the eggs are intended for hatching."

A Mere Pinch May Be Enough

To what extent, then, *can* animal protein supplements be replaced by the new fermentation products which contain vitamin B_{12} and unknown factors?

Dr. Norris says, "It seems undesirable, at present, to replace all the fish or meat products with APF supplements containing vitamin B_{12}."

According to H. R. Bird, "Speaking conservatively, we may say that the animal protein supplements can be replaced in part, leaving a minimum of 4 per cent fish meal, of 8 per cent meat meal in a high efficiency broiler mash, and 2 per cent of fish meal or 4 per cent of meat meal in a starting mash for chicks intended for flock replacements or in the total diet of breeders.

"If the feed already contains less than these amounts of animal protein supplements, and it is believed that many feeds do, there is a good chance that addition of a vitamin B_{12} supplement will improve results. In numerous experiments all the animal protein supplement has been replaced with good results, but in other experiments with other diets, results have been inferior. It is necessary, therefore, to answer this question conservatively. When animal protein supplements are replaced, care must be taken to replace the protein, calcium, and phosphorus as well as the vitamins."

All of which throws the problem back into the lap of the farmer. If he takes the current news-reports at face value, hoping the new discoveries will take the place of good management in producing "super animals," he is headed for disappointment. If, however, he understands the nature of the unfolding knowledge of growth factor and nutrition, and can apply it to meet his specific needs on his particular farm, he undoubtedly will find that he is utilizing feed with greater efficiency and at reduced cost.

There is indication that raising chickens on built-up litter and permitting pigs and poultry to run on range after cattle is part of good management. In the warm months at least, they will obtain a natural source of several necessary food elements (and antibiotics, perhaps, as well). Exactly how much they will get has yet to be determined.

The designing of a correct cropping program for a plot of land is one of the most important phases of farming.

Rotation Pitfalls

Nobody really knows why, but some crops just don't work well together.

By WILLIAM ACKERMAN

WHY is it that when carrots or millet are grown, then the land planted to corn, poor yields of the latter crop often result? Yet, when oats are planted and followed by corn a very good yield is usually produced?

It has been found more by favorable experience than actual scientific evidence that certain crop rotations result in good yields. It has also been found that other combinations of certain rotation crops result in greatly *reduced* yields.

High yields are important to all farmers and the proper selection of rotation crops can do much to assure a profitable crop. Long series of experiments indicate definite relationships between successive crops. Tests have been compiled of crops producing favorable effects on succeeding crops and those that produce detrimental effects. Here is a summary of the results:

Oats: If a crop of oats has been grown on a section of land and it is desirable to plant a different crop the following year it will be well to consider those crops which will grow the best. Good follow-up crops for oats are corn, timothy, potatoes, onions and alsike clover.

Potatoes: Good follow-up crops after a planting of potatoes are: corn and buckwheat.

Squash: Should be followed by potatoes, buckwheat, alsike clover, onions, and timothy.

Cabbage: By corn and timothy.

Rye: By alsike clover, potatoes and timothy.

Redtop: By alsike clover, onions, and potatoes.

Onions: By timothy, corn, alsike clover, buckwheat, and potatoes.

Corn: By alsike clover and potatoes.

Soybeans: By head or leaf lettuce, and possibly squash.

Of course, these follow-up crops are not the *only* ones which should be made use of in the rotation. They are merely the ones that have shown the least tendency toward reduced yields when planted after the crops indicated.

Many reasons have been given for the influences of crop plants on those that follow. Some of these reasons seem to be substantiated at least in part by scientific research. Others are apparent only by observation. Despite many studies of causative factors, a satisfactory general explanation has not yet been found. The separate factors have been studied by various people, but no one has attempted to correlate all of the factors. The various experiments have indicated the following possibilities. 1) crops that remove excessive quantities of mineral elements tend to affect follow-up crops that need those elements. 2) Some crops remove chemically basic elements causing the soil to be more acid after these crops have been grown. 3) Organic toxins excreted by the roots of certain plants, or the decomposition products of plant residues, may leave harmful substances in the soil temporarily or permanently.

It has been suggested that some rotation crops fail because crops preceding them take out the nutrients they need. But with our present day knowledge of fertilization it is logical to believe that the question of nutrient supply is not the answer to the problem of unsuitable rotations.

Experiments have shown that crops which remove the largest amounts of the scarcest nutrients were not always the ones which had the most depressing effect on a succeeding crop.

Don't Waste Time Killing Ragweed

Several prominent doctors have recently come to the conclusion that pollen does not cause hay fever and that it is a waste of time to go around pulling out plants that have been accused of being hay fever causers for many years. In one series of checks a doctor found that not one of his hay fever patients had any pollen in his nose. The real cause of hay fever, he says is — stated in oversimplified language — too much moisture in the late summer and fall air. At these times of the year the membranes in "hay fever" sufferer's noses are not efficient enough to equalize excess moisture.

Some crops leave the soil in which they are grown more acid. The relation between the acidity of the soil and the success or failure of subsequent rotation crops has been studied in field tests.

Onions, a crop which is rather sensitive to soil acidity, were grown following other crops which by previous tests had produced either good or poor yields. Half of each section grown in onions following a particular crop was limed so that the soil was made neutral. The other half was left unlimed. The growth of onions was generally poorer on the unlimed area. Nevertheless, following corn and rye, onions grew about as well on the unlimed as on the limed area. On the unlimed area they almost failed to grow following beets and millet, but were much improved by the lime. The onions following cabbages almost failed to grow on both treated and untreated plots.

Pot experiments gave similar results to those found in the field. The highest acidity occurred in the soil in which rye and buckwheat had grown successively. Onions and redtop were followed by lower acidity and better crops of onions. Mangels also were followed by as low an acidity, yet onions grew poorly after them, the same as in the field.

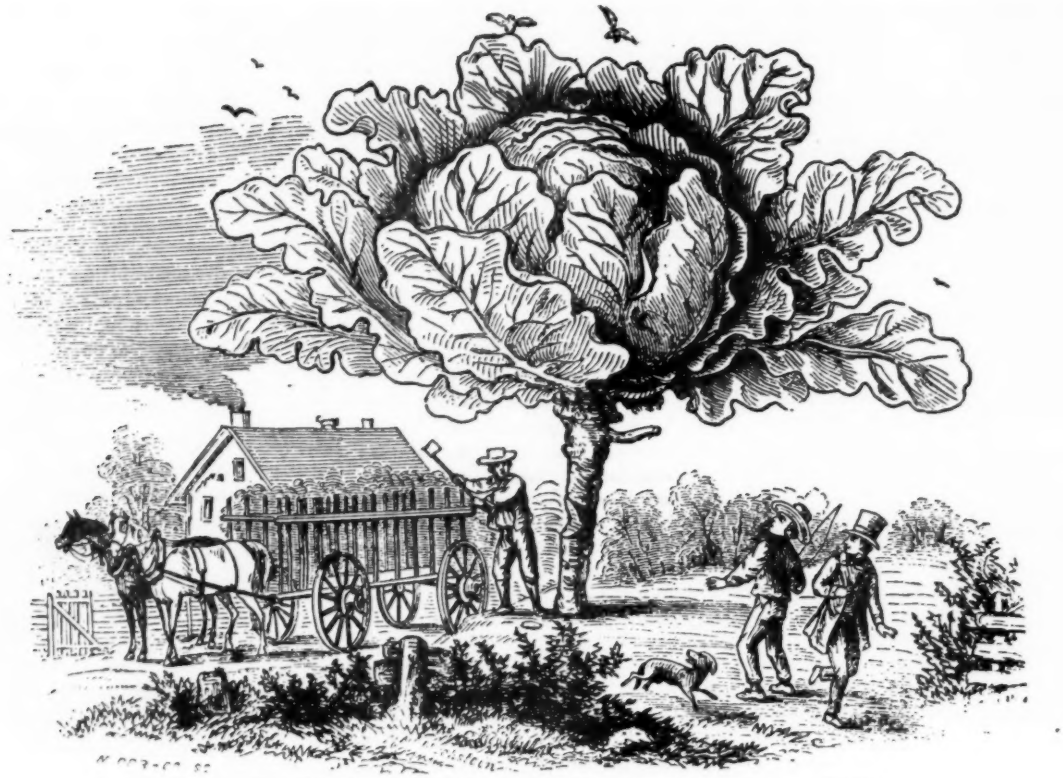
Soil acidity was affected differently by the several crops grown and generally, the best yields of onions followed the crops giving rise to the least acidity. The aspect of soil acidity assumes considerable importance because the effects of crops on those which follow were much less if the soil acidity was reduced by liming.

The toxic substances produced from certain plant residues appear to injure the root systems of subsequent crops. Once the roots have become injured they are easy prey to disease and microorganism attack. It was found that root rot was greatest where the plant residues of the previous crop were only partly decomposed. The further the process of decomposition had progressed the less severe was the injury from root rot. Complete decomposition of plant residues resulted in negligible injury from root rot.

The injurious effects of certain crop residues can not be used as an argument against the use of organic materials. It merely indicates that caution should be used in the type of plant residues used and in the application of the raw materials in the soil where plants are growing.

Certain crops cannot be successively planted without severe losses from root rot in the second crop. Care in the choice of the subsequent crop and especially in the allowance of time for decomposition is necessary.

Anyone interested in getting more information about the influence of crop plants on those that follow can get it from the Connecticut Experiment Station at New Haven and the Rhode Island Experiment Station at Kingston.



"A Dream That Was Not All a Dream" (What happens when you use compost.)

200 Years of Organic Farming

PART IV

Concerning commercial fertilizers and advice on organic farming a century ago.

By ALDEN STAHR

IF YOU think the organic farmers of today are alone in their battle against the use of commercial fertilizers you should see what the old American Agriculturist and its fighting editor, Orange Judd, had to say about them about 100 years ago:

Plaster of Paris

"Gents – We have heard many complaints among our farmers who use this important stimulant and particularly from those who have recently commenced its application, that it failed in numerous instances last year . . . They doubt the goodness of the article or its adaptation to their soils . . . the materials of gypsum are lime chemically combined with sulphuric acid; commonly known as oil of vitriol or vitriolic acid; which is one of the strongest mineral acids and consists of sulphur and oxygen with the addition of a little water . . . it (plaster of paris) is a stimulant, as well as manure, and has a tendency to exhaust the humus already in the ground."

Mineral Manures

"Not a day passes without inquiries in regard to the value of this or that fertilizer offered to the public. Mineral manures, as a class, are not worth the price asked for them after they have been through manufacturers' hands. We look upon the whole genus of super-phosphates as not worth purchasing . . . We be-

lieve that the value of any concentrated manure depends mainly upon the amount of *organic matter* (that is, animal or vegetable matter) which it contains."

Super-phosphate Manures

"These are industriously pushed upon farmers by means of specious names, false statements, ingenious theories, and the teachings of so-called agricultural papers in the interest of manufacturers. We do not speak at random when we advise cultivators to let them alone, unless they have money to throw away."

Experiments with Bought Fertilizers

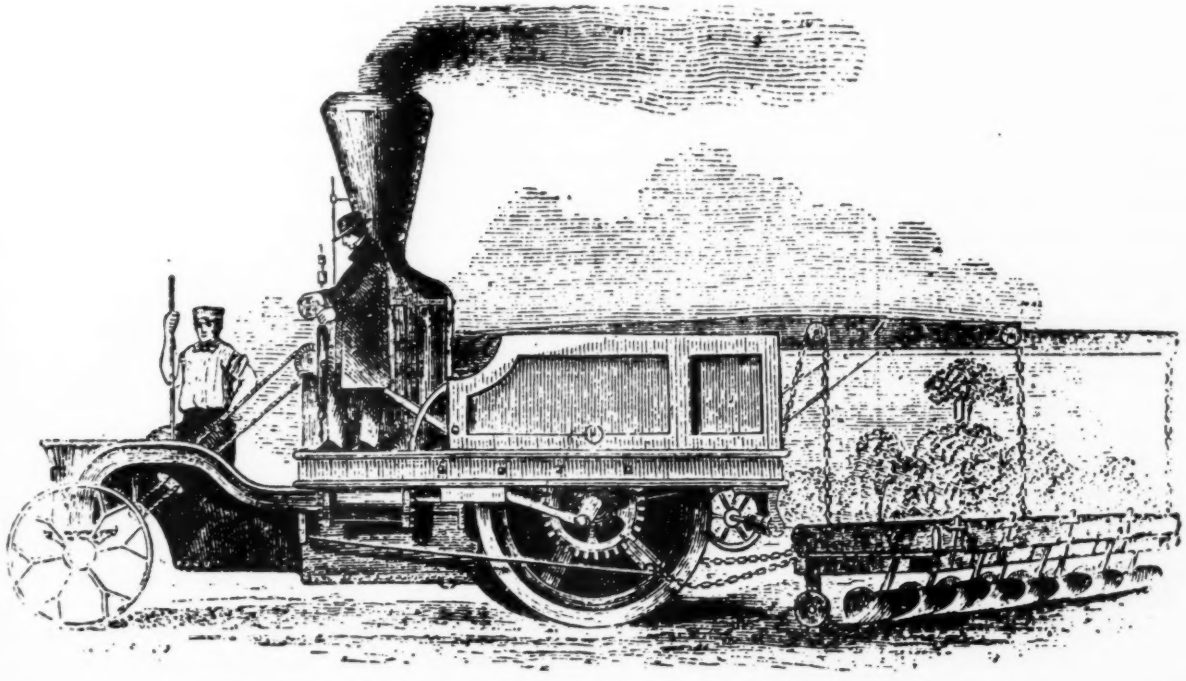
"A neighboring farmer who is fond of experiments, last season put stable manure and harbor mud in competition with the concentrated fertilizers. The land selected for the experiment, lay in adjoining fields, and was as nearly of a same character as possible, a gravely loam well adapted to corn. Both pieces consisted of several acres. The one was manured liberally with the mud and the manure at the rate of about thirty cords to the acre. The other was manured with super-phosphate of lime, American guano and Sombero applied at the time of planting, and in sufficient quantity to have given him a full crop, if the estimates of the salesman were correct. The former field was hoed but twice, and yielded 86 bushels of corn to the acre, with a large amount of stover, making grain and fodder worth about $100 to the acre. The other piece of corn was hoed three times, and yielded only 16 bushels of corn to the acre, with about half the amount of fodder in the other piece, making the crop worth about $25 to the acre. The bulky manure was all made upon the place; the other cost money. The one field paid a handsome profit upon the labor of cultivation; the other brought him in debt. The experiment has established him in the faith that high manuring is the only true economy in farming. Rub in the manuring, good measure, pressed down and shaken together, and the like measure of grain will come out in the harvest."

Organic Materials Recommended

Although Judd advised against the use of commercial fertilizers, he spent more time preaching the positive side of organic farming, the plentiful use of organic materials of various kinds.

Green Vegetable Manure

"This has been used for upwards of 2,000 years in countries where the art of culture has been most attended to. Various crops have been sown with no other view than to be buried in when fully grown to render the soil fertile for crops of more importance. Every species of vegetable, in a green state, acts more or less as a fertilizer, some probably more than others, according to their power of draining organic matter from the air and inorganic matter from the subsoil. It is, therefore, no detriment to the soil to be covered with weeds, providing they are not allowed to seed and that they be dug into the ground instead of being hoed down and raked off, which latter process is a direct robbery of the soil. Green vegetable manure is most effective on light sandy soils and least so on peaty lands. It is surprising how much valuable manure is wasted in gardens by carrying it to the compost



Fawke's American Locomotive Steam Plow, ancestor of the push-button tractor of today.

200 Years of Organic Farming

Continued

heap, instead of at once burying it in the soil; and how much is lost or neglected in woods and waste places from mere indolence or from want of knowing that rampant nettles and rank growing plants constitute a great amount of the food of plants. Tree leaves and the mowings of lawns are valuable manures and far too seldom turned to useful account. For using green vegetable manure, it should be applied as soon as possible after it is cut."

HOMEOPATHY

"Our picture sheweth the perplexity of farmer Thomas at the conflicting theories of those who have an infallible cure for his sick land. The 'Patent Manure' agent sheweth conclusively that one bushel per acre of his medicine will prove an infallible cure for all diseases of soils. The 'Mineral Manure' man and the 'Super-Phosphate' man sheweth likewise, but Thomas still doubteth."

Vegetable Manures

"Many farmers advocate the practice of summer fallow, on the ground that it destroys weeds; their man's economy comes strangely in conflict with nature, as her customary efforts are to cover all the waste places with organized plants that nothing be lost which can add to the ultimate growth of the vegetable kingdom . . . If a farmer would sow rye or some other seed immediately after he has worked the soil for the last time, a fine vegetable matting would cover the whole surface immediately after the corn is removed. This vegetable growth, plowed under the next spring, would almost supersede the necessity of any other application of manure."

Corncobs for Manure

A Mr. McCullough of Shelby County, Ohio, and several other readers asked about the manure value of corncobs. In reply, Judd said: "We have delayed an answer to this question, because we have not had experience enough to instruct others. Our opinion is, that corncobs, like all other organic matters, are valuable for incorporating with the soil. They are valuable only in proportion to their weight, of course. We think the best disposal of them is to plow them into heavy soils, which they will help to lighten; or to place them around fruit trees as a mulch."

Gurneyism

Speaking of mulching fruit trees, the editor made two references to a practice then called "Gurneyism" which he described as "covering meadows and pastures with straw or refuse vegetables." In a separate item he spoke of Gurneyism as applied to fruit trees:

"We have lately seen several instances of this system which should commend it to general adoption in all cases where there can be any hope of benefit from its use. The first was in an orchard consisting of nearly 1,000 apple trees belonging to Mr. L. F. Allen on Grand Island. This orchard had been planted four or five years on a hard clay soil and during all the previous seasons had made little growth nor scarcely borne an apple. Last spring a large forkful of swamp grass was spread around the trunk of each tree and the consequence has been constant dampness on the surface of the ground beneath the hay and a more vigorous growth than has ever before taken place, while almost every tree is covered with fruit.

"Another friend practices mulching with salt hay, which is much better for this purpose than the preceding.

"Another friend uses the shives (the woody portion) of flax. By giving a thick covering of these to the ground around the trees all the benefits of moisture are secured. There is a decided advantage to the use of this material as it does not require to be raked off like straw and hay on the approach of cold weather, to avoid harboring field mice or other vermin, which frequently commit great ravages among the trees during winter when they have a hiding place near. The cutting of the hay or straw in a cutting machine would prepare it equally well for this purpose, as the shives of flax."

Compost

Two references to compost were of interest to me. The first was a note by J. Pott of Fulton County, Pa.: "Why make compost? The benefit attained by composting leafmold, tan-bark, lime, etc., is that the ingredients are brought into closer contact, and act upon each

other more readily than if each article was applied to the soil separately."

And the other item was entitled "Sawdust in Stables – there are at least two opinions about the usefulness of sawdust in stables. One is, that it is an excellent article to absorb the urine of animals, and so save it; and likewise to prevent the effluvia of stables, which is so disagreeable to man, and so unpleasant and hurtful to beasts. And besides, it is an excellent ingredient in the compost heap, decaying and becoming manure itself. Consider, too, that it is easier to manage than straw litter, in cleaning out the stalls; easier also to shovel over the compost heap, and easier to spread upon the soil and to mix thoroughly with it."

Weeds for Manure

In addition to the usual cover crops as green manures one reader suggested using weeds for this purpose. In this he was a hundred years ahead of his time, for only now are we beginning to appreciate the value of weeds in agriculture. As Orange Judd said:

"It is gravely proposed, in one of our exchanges, to use weeds for enriching land! The writer claims that they keep the land moist, by condensing dew and conveying it down to the roots of the plants, and by keeping the ground shaded. When they attain considerable size, the farmer plows them under, just as he does clover crops.

"At first, we thought this writer must be some lazy wag, but on studying him closer, we are satisfied that he is a grand reformer in agriculture. 'Why should the weeds be wasted,' he asks, 'and time and labor lost in trying to extirpate them, when they were evidently designed to grow and to be made useful?' Now, it may be making the best of a bad bargain to plow under a heavy growth of weeds which have once got the start of us, but to grow a crop of them 'on purpose' to use them in this way is bad policy. Do they not exhaust land of fertility which should go to the growing crop? And is there not great danger that if weeds are allowed to grow under full headway, they will prove too much for the farmer to subdue? If they go to seed, what a crop of mischief they make! White daisy, thistles native and foreign, docks and the rest are dangerous things to trifle with. Manure made in this way will probably cost too much."

In this case the farmer was a bit smarter than the editor, for he realized that, instead of exhausting land of fertility, weeds bring up extra fertility from the subsoil and give this to the crops when the weeds decay.

ALLOPATHY

"Farmer John hath certain notions of his own in regard to medicines for his family, but whatever these may be, he holdeth fast to the old fashioned All-o-path-ic treatment for sick land. He believeth particularly in stimulating the land with large doses of organic manures, the best of all medicines for a weak, emancipated soil; and Farmer John's experience confirmeth his theory."

Save the Leaves

The recommendation of *The Organic Farmer* to save leaves is no new-fangled notion. A century ago, Orange Judd said of them:

"If Brother Jonathan (referring to a reader) were as saving of manures, as John Bull is, he would be a better farmer. No one knows until he has seen it how careful English and European farmers and gardeners are of everything which may be converted into manure. And this is one ground of their superiority in agriculture.

"Now let us repeat what we have often said, that few things are more valuable for fertilizing purposes than decayed leaves. They are hardly inferior to barnyard manure. Gather them up now, this very month of November, before they are covered by the snow. They are abundant everywhere, lying in heaps and windrows in the forest and by the roadside, and by the fences in every yard. The woodlot should not be stripped clean of them; but doubtless every farmer's land contains more of them here and there, than he can find time to cart home. Gather them up by raking or by sweeping with a large birch broom. Stack them and pack them in a large wagon, adding side boards as high as convenient; you will hardly get too heavy a load. Cart them home and use them for bedding for cattle and horses; use them for compost in the stable-yard; use them to protect tender grapevines and shrubs and plants in the winter. Strawberry patches will fairly sing for joy under such a feathery blanket. By all means save the leaves and use them."

Spring Bite for Cows

A Pennsylvania farmer asked Judd what crop would give an early bite

200 Years of Organic Farming

Continued

for the cows in spring and which could also be turned in for wheat in the fall. Judd answered:

"It is somewhat difficult to pasture a crop and plow it under at the same time. One can not very well eat his cake and keep it too. Rye furnishes good feed earlier than almost any other crop. But if one expects to make manure of it, it should be left to grow until in blossom and then be plowed under. If fed through May and June, the growth must be small and not much benefit will be derived from plowing it under. The better way in husbandry is to do one thing at a time and to do it thoroughly. If the land needs manure and is so far from the barn that fertilizers can not be carted economically, it is brought in good heart by turning in green crops. When this is done, we should make a business of it and turn in two crops in a season, or one crop of full growth.

"We may sow Fall rye on the corn stubble, as proposed by our correspondent, turn it in the last of June or first of July, and sow buckwheat immediately, which will be fit to turn in the last of August. Or we may sow clover in the same way and follow with buckwheat. This will give two full crops and restore a very large mass of vegetable matter to the soil. The rotation which our correspondent mentions, *viz,;* corn, oats, wheat and grass, would be improved by one year in potatoes or some other root crop. In a farming district so near a good market as Bucks County, Pa., we doubt very much whether green manuring is economical. There ought to be a steady and remunerative demand for animal products — beef, pork, mutton, veal, lamb, butter, cheese, eggs, poultry, etc., and every vegetable product should be consumed upon the farm, and large quantities of manure be manufactured to keep the land in a highly productive state. Where there is a good market for animal products, it is much better economy to manure with animal fertilizers, than with vegetable. If, while the ground is in corn and in roots, it is manured with fifty or more loads (half cords) of good manure, it will bear a crop of wheat, and two or three crops of grass without manure.

"The best roots for feeding are carrots, beets, mangel wurzel, and turnips, one, or all of them, according to the circumstances of the farmer and the kind of stock kept. These fed out to stock with hay and grain, make large quantities of manure, and keep the land in good heart."

Benefits of Mulching

"J. D. writes that he finds much advantage in mulching the ground around peas, cabbage, cauliflowers, tomatoes and many other garden vegetables, particularly when drouth prevails. We prefer this treatment to artificial watering of plants, except where very long continued absence of rain makes it absolutely necessary. Everyone must have noticed that the surface of the ground covered by a stone, a board, or even a layer of straw, is almost invariably damp, free evaporation of the water rising from the deeper soil having been prevented. Give the ground to be mulched a thorough hoeing to clear it of weeds and facilitate the ascent of moisture, and apply an inch or two of loose straw, hay, sawdust, or other light material that will not exclude air."

This idea of the rising of water from the subsoil and the wisdom of not interfering with it has a modern exponent named Edward H. Faulkner, author of "Plowman's Folly."

Looking Ahead

A nice closing thought is expressed in a parenthetical note by Orange Judd: "Old lands are not like old horses, which must inevitably become useless; feed them properly, and they will retain their strength. Happily for the country, this is being discovered and acted upon, though to a less extent than we hope to see at no distant day."

I have a feeling that Orange Judd would be pleased at the growth of organic farming in the country today.

Wanted, a "Combine" Ditch Machine

By Benjamin Manz

Each fall thousands of farmers are confronted with the task of mowing drainage ditch banks and removing or burning the trash, the latter being most popular. Since the mowing machine is not very well adapted to such a job the scythe is still used a great deal, making it annual drudgery. The ditch banks, enriched by eroded topsoil and leached nutrients, produce, in spite of an annual, burning, a lush growth of grass and weeds. Thus an incalculable amount of potential humus goes up in smoke to complete the dismal picture. The organic farmer who did want to remedy the situation would find it a task indeed to move this organic matter out of the ditch.

We present this problem to the machinery manufacturers: Make a machine that will (1) mow the banks, adjusting to varying degrees of depth and slope, (2) convey this trash to a cutter and chop it up into short lengths, and (3) blow it, either into the field alongside or into a towed manure spreader. Such a machine, if mechanically sound, in the hands of custom operators, should do the job cheaper and better than hand labor, and save thousands of dollars worth of fertilizer for the American farmer. Mr. Manufacturer, that is your job. I am sure there is a market waiting.

The Hackman "organic" goats are well trained and contented. They automatically jump to their place on the milking stand.

"Things Began to Happen"

A pamphlet put the Hackmans on the road to premium organic profits.

By MARJORIE and GRANT HEILMAN

Photos by the authors

"WHEN we took this farm," John Hackman explains to visitors, "we thought that all it needed was good management and a little capital. The soil was in terrible shape but we blamed it on the laziness of former tenants, and on their lack of money for chemical fertilizers.

"So we put the farm in order, mapped out a crop program, poured chemical fertilizers into the soil, and waited for the miracles to happen. Three years later we were still waiting. Crops just didn't grow."

It was about this time that the Hackmans read the pamphlet "Compost and How to make It", and first heard of organic farming. After studying the material thoroughly, they decided to try farming without chemical fertilizers. They began compost heaps, took advantage of the quantities of manure their animals produced, and planted cover crops.

"Before long," as John Hackman puts it, "things began to happen."

Today their 84 acre farm near Lititz, Pennsylvania, is producing better every year and there hasn't been a nickel's worth of commercial fertilizer on it for nine years now. For the past three years, in addition to their use of compost, the Hackmans have been building up the mineral content of their soil through use of natural rock phosphate. And they are actively planning the use of other natural mineral supplies to combat the deficiencies which a soil analysis revealed.

The Hackmans' biggest product is goats — floppy eared, friendly Nubians. Their herd is one of the best in the country. Usually about a hundred of the goats browse the Hackman hillsides, and about sixty of these are milked. Biggest part of the goat business for the Hackmans, however, is not in the milk, but in selling breeding stock to other dairymen. All of the Hackman breeding stock is imported from England, and United States breeders come to the Hackmans when they want top-flight blood lines for their herds.

In addition to their goat herd, the Hackmans also raise white leghorn chickens. Usually there are four to five thousand layers in the big rooms in the upper sections of the barn. The eggs are marketed retail in a house to house egg route in Philadelphia, about 70 miles from the Hackman farm.

But very possibly the most interesting part of the Hackman products is their organically grown foods. Since they began farming the Hackmans have grown wheat, corn, oats, barley, alfalfa, soybean, and sunflower seed.

Although the primary purpose in growing these grains has been to provide livestock feed, John Hackman

long ago discovered that organically grown foods bring premium prices when sold for human consumption.

So he installed a small electrically powered stone grinding mill and grinds his grain into flour. He sells corn meal, soybean, and whole wheat flour. The latter brings fifteen cents a pound when it is sold retail, and the Hackmans market between four and five hundred bushels a year. A good many people, it seems, realize the value of organically grown food.

Sunflower seed is hulled and sold retail at a dollar a pound. Many of the Hackmans' organically grown products are available through natural food stores in several states.

All of the vegetables which the Hackmans raise for their own use are organically grown. The garden is composted every year and it produces enough vegetables for a year around supply.

During the summer months the Hackmans sheet compost their fields. But they have been building up compost heaps during the winter as a second choice substitute for sheet composting when it is difficult to get their manure spreaders and tractors into the fields.

The chickens and goats provide an excellent source of manure for composting; and in addition the Hackmans have fifteen riding horses which they hire out to local equestrians. These horses also produce their share of manure.

When they compost in heaps, the Hackmans use plenty of straw along with the manure. And in addition, in their spare time John Hackman and his son Gene gather leaves for composting. Of course the entire garbage scraps from the family meals get added to the heap.

John Hackman has only to look back on the poor crops he had when he started farming Mountain Brook Farm to be sure that the organic method is the right one to follow.

He particularly likes to tell the story of his favorite alfalfa field by way of a demonstration of the powers of organic farming. He had tried several times to get a good stand of alfalfa in a field at the top of a hill. But the alfalfa never caught.

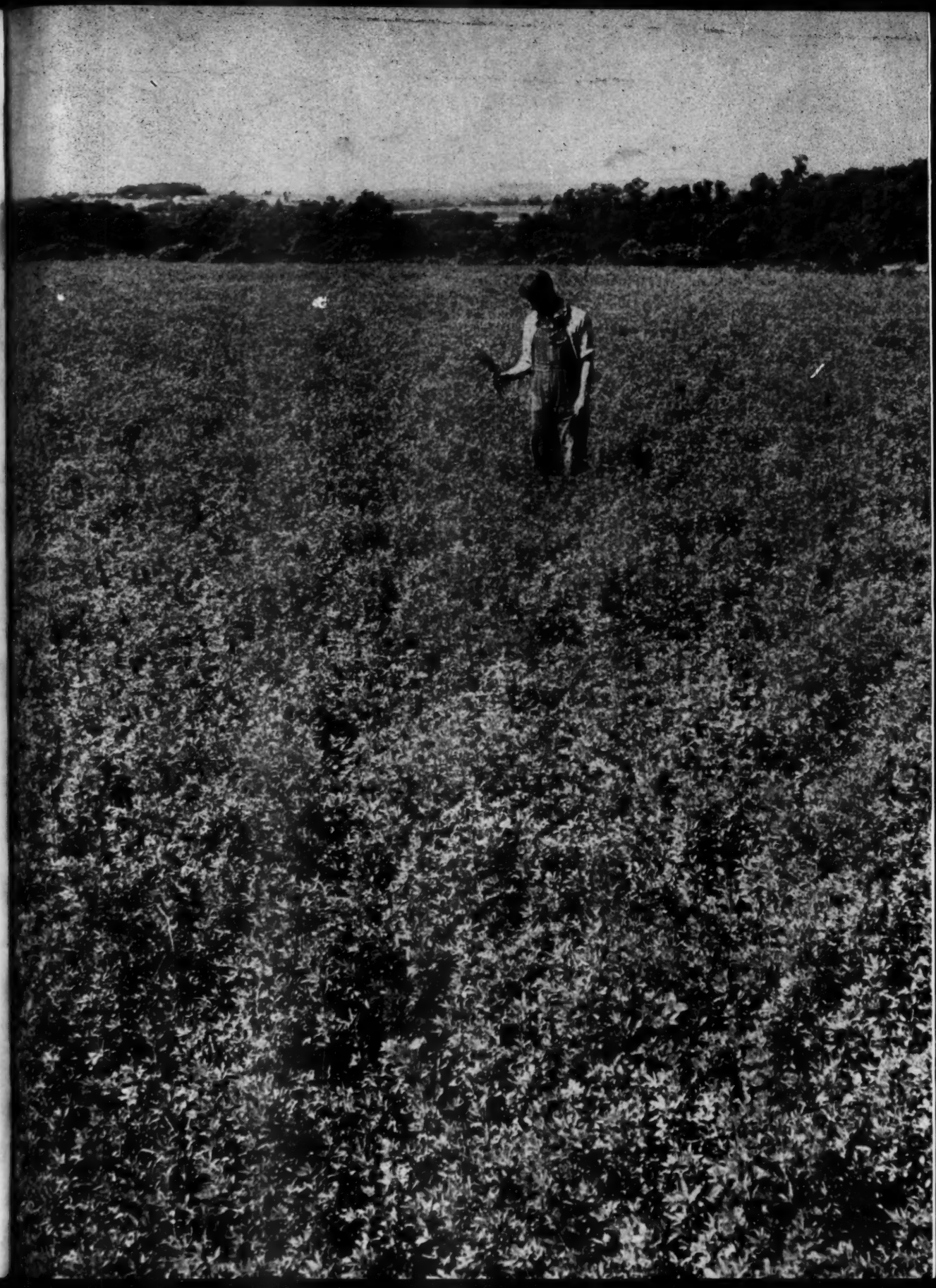
Then, five years ago, he composted the field heavily. There has been a rich lush growth of alfalfa in the field every year since. And he ordinarily cuts four hay crops from the field during the summer, although this year a severe rainy spell cut his hay yield to three crops.

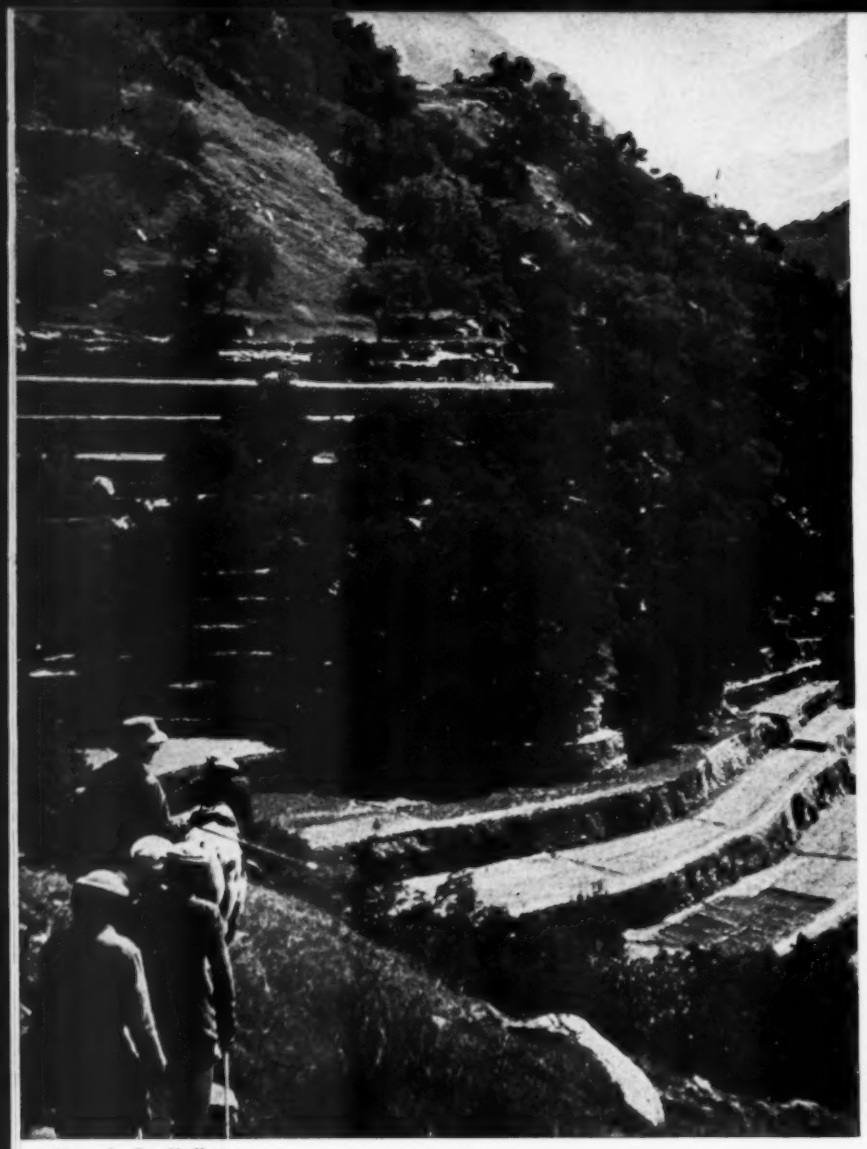
The Hackmans are a family which has experimented and proven to themselves the powers of organic farming. "We haven't put an ounce of chemical fertilizer into our soil for nine years now," John Hackman says, "and I hope we never do again."

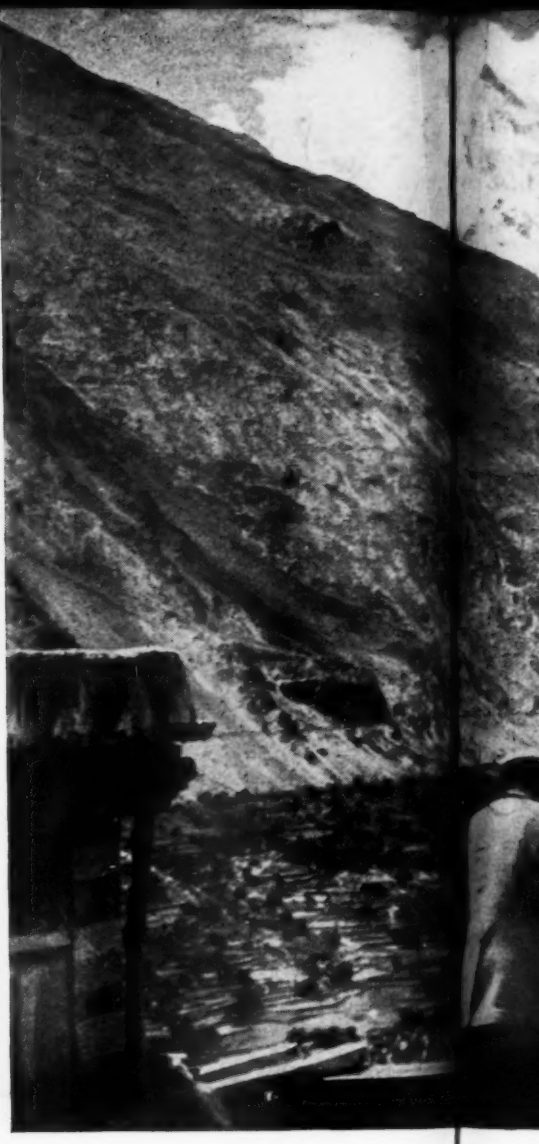
→

John Hackman stands in his favorite alfalfa field. Before being composted, alfalfa wouldn't catch at all in this field. For the past five years, after being composted heavily, it has continually grown heavy alfalfa crops — usually enough for four cuttings of hay a season. This is a two week's growth.

It must be that organic feed they like!







Photos by Eva Maillart

An Organic Shangri-La

The chemical-free land of the Hunzukuts is a bright spot in a dark continent.

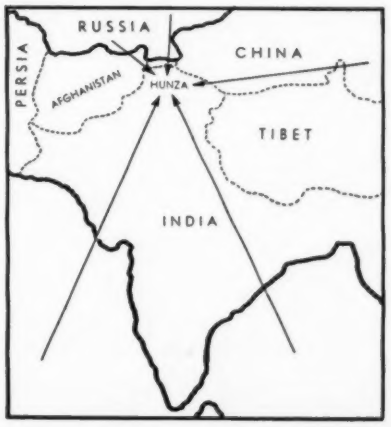
AT THE northernmost tip of India, separated from Russia by both an Iron Curtain and mountains of stone, lies a hidden valley inhabited by a remarkable race. Hunzukuts they are called, and sickness is practically unknown to them. Fatigue too must be rare, for they have no word for "tired" in their language. It is not uncommon to see a cheerful man of Hunza walk sixty miles over the mountains barefoot or plunge naked into a glacier fed river through a hole cut in the ice.

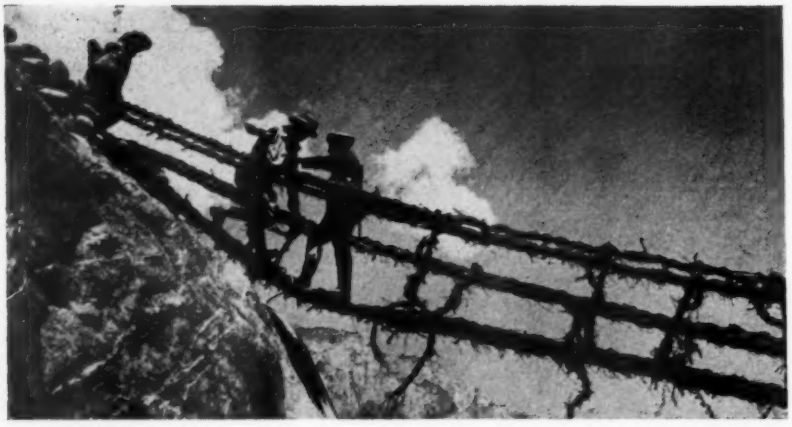
For years the Hunzukuts have

Left: A scene in the Hunza valley on the road to Gulmit. Alfalfa and wheat are growing in the terraced fields. Above: The view from the top of the castle of the Mir, ruler of Hunza. Rakposh peak, 25,550 feet high, rises in the background. The dark objects in the right foreground are ibex horns, protection against the evil eye.

attracted the attention of men of science and the just plain curious. Sir Robert McCarrison, a prominent English physician, has made perhaps the most extensive first hand investigation of the health of these happy people. He gave as one of the prime reasons for their strength of body the fact that "The people live on the unsophisticated foods of Nature: milk, eggs, grains, fruits and vegetables. I don't suppose that one in every thousand of them has ever seen a tinned salmon, a chocolate or a patent infant food, nor that as much sugar is imported into their country in a year as is used in a moderately sized hotel in a single day."

But of immense importance to us Americans is the Hunzukut's *technique* of food production. He uses no chemicals to substitute for God-given farming methods. Every particle of his food is premium in quality – and not adulterated by traces of insecticide or weed killer. Here is a concise description of Hunza Agriculture from the book *The Healthy Hunzas* by J. I. Rodale, which can





A suspension bridge crossing the river of Nagar, made of bark creepers twisted around a steel cable.

An Organic Shangri-La

Continued

be purchased from *The Organic Farmer*:

"The way they make their fields level, the way they build their dry stone walls, the way they lay out the cut barley in tidy rows — every operational detail of their agriculture is performed with elaborate detail and loving regard for the welfare of the soil. They carefully rotate their crops in a planned sequence which has worked well no doubt over centuries. After the barley crop is off in June, millet is sown. After wheat comes buckwheat, thus giving them two crops a year. This has to be done because of the urgent need for food on the part of the growing population and even then there is the dangerous period at the end of the Spring when the Hunza pulls in his belt and exists on starvation rations. They are self-contained. They import or export little food on account of the poor road facilities and limited amounts of crops. This isolation

Here are the village and fields of Aetit. One can see the threshing places and the long, narrow polo field — the only ground in Hunza large enough for the playing of this national game.

contributes largely to their self-reliant frugality. They have many varieties of seeds of each plant which they use with rare intelligence and which are chosen on the basis of the particular soil, water and other cultural conditions involved with respect to each crop and each location."

William Martin Conway, an English explorer of the last century, describes clearly the Hunza terraced fields and irrigation systems. "To build these fields," he says, "was the smaller part of the difficulties that husbandmen had to face in Hunza. The fields had also to be irrigated. For this purpose there was but one perennial supply of water — the torrent from the Ultar glacier. The snout of that glacier lies deep in a rock-bound gorge whose sides are, for a space, perpendicular cliffs. The torrent had to be tapped and a canal of sufficient volume to irrigate so large an area had to be carried across the face of one of those precipices. The Alps contain no *Wasserleitung* which for volume and boldness of position can be compared to the Hunza canal. It is a wonderful work for such tool-less people as the Hunzukuts to have accomplished, and it must have been done many centuries ago and maintained ever since, for it is the life's blood of the valley.

"The whole of this side of the debris-filled floor of the valley, between the cliffs and the edge of the river's gorge, is covered with terraced fields. They are terraced because they must be flat in order that the irrigating water may lie on them. The downward edge of each terrace must be supported by a strong stone wall, and every one of these walls is of cyclopean work like those just described. The cultivated area of the oasis is some five square miles in extent."

Well, there is a picture of the wondrous land of the Hunzas. We will do well to learn a lesson from them.

This typical Hunzukut, an elder of Aliabad village, has a beard dyed bright red.

Experiment Station Report

A summary for organic farmers of recent agricultural research.

Soil and Fertilizer

How is the Volume-weight of a Soil Affected by Organic-matter Additions?

When Collington sandy loam and Sassafras loam were subjected to organic-matter treatments, the soil weight per unit volume decreased in proportion to the organic matter added. The crop yield increased as the soil weight decreased.

—Herbert C. Nikola

New Jersey, 1948 — 1949

The Availability to Plants of Green Manure Phosphorus.

Radioactive phosphorus was used to measure the magnitude of the direct contribution of phosphorus in a green manure crop to the nutrition of a succeeding crop. Alfalfa was grown on a high level of phosphorus containing radioactive phosphorus. The alfalfa tops were then harvested and incorporated into 2 gallon pots of Crosby silt loam and white silica sand. The efficiency of organic versus inorganic sources of phosphorus was compared by adding an amount of inorganic phosphorus equivalent to the total phosphorus added in the green manure treatment to the soil and sand treatments. Sudan grass was used as the succeeding crop.

The results of the experiment indicate that the green manure was as effective a source of phosphorus as the inorganic phosphorus on the phosphorus-deficient Crosby silt loam. The possibility that this is true of all green manures is of immense practical significance, especially since only five weeks elapsed

between incorporation of the green manure and the crop harvest.

This work is reported in detail in the manuscript, "A Study of the Utilization of Phosphorus in Green Manure Crops by the Succeeding Crop Using Radioactive Phosphorus" by Joe L. White, Maurice Fried, and A. J. Ohlrogge in the Agronomy Journal (In press) 1949.

Indiana, June 1949

Can the Capacity of a Sandy Soil to Store Fertilizer Nutrients be Increased?

Organic-matter additions offer the most promise in increasing the storage capacity of sandy soils. An 8-year experiment has just been completed with a considerable variety of organic materials, including rye, ryegrass, and ryegrass and vetch as winter covers, and a number of hauled-in organic materials. By the end of the test the green manures and hauled-in materials had added an average of 20 per cent to the storage capacity of Collington sandy loam and Sassafras loam. Further verification of this was found in the increased content of available calcium, magnesium, and potassium in the soils that contained the most organic matter. Hyper-Humus, a cultivated peat product from a north Jersey bog, was especially effective for this purpose.

Arthur L. Prince and Firman E. Bear

New Jersey, 1948 — 1949

Earthworms and Soil Structure

Aggregates formed from soil materials in the intestinal tract of the earthworm and excreted as casts were found to be highly resistant to the impact of falling water drops. After excretion, the casts showed a large increase in the number of bacteria present and a decrease in water stability.

Maryland, 1948 — 1949

Phosphate Tests on Sandstone Soil.

Various phosphates have been compared, since 1930, in a three-year rotation of corn, wheat, and legume-grass hay on sandstone soil. Superphosphate and basic slag were applied at rates to supply equal amounts of phosphoric acid. Fine-ground (300-mesh) and coarse-ground (100-mesh) rock phosphate were applied at rates to supply twice as much phosphoric acid as the superphosphate and basic slag. Potash, nitrate, and manure have been used with all the phosphates.

On unlimed land, the yield of corn, wheat, and hay during the first six rounds of the rotation has been highest on the plot receiving 300-mesh rock phosphate. Yields on the superphosphate plot were only slightly lower on corn and wheat and 620 pounds per acre lower on hay. The basic-slag plot yielded only 2.8 bushels less corn, 1.7 bushels less wheat, and 185 pounds less hay per acre than the 300-mesh rock phosphate plot. On limed plots, the plot receiving 300-mesh rock phosphate yielded 1.2 bushels more corn and 296 pounds more hay per acre than the superphosphate plot. On the plot receiving the 100-mesh rock phosphate, yields have been only slightly lower than on the plot receiving the 300-mesh materials. All these phosphates have produced satisfactorily on this sandstone soil. Other tests show rock phosphate to be somewhat less effective on limestone soil.

Kentucky, 1949

Liberal Use of Fertilizer Creates Need for Dolomite.

On the lighter soils, studies in potato growing sections have shown that the use of heavy amounts of fertilizer are resulting in strong acidity. Excessive amounts of soluble manganese and aluminum have been released, and a noticeable build up in active potassium and phosphate and a deficiency of magnesium have resulted. The wise use of dolomite is suggested by F. G. Merkle.

Pennsylvania, 1949

Does the Relative Level of Potassium Nutrition Influence the Severity of Boron-deficiency Symptoms in Plants?

Yes, Boron-deficiency symptoms in tomato plants were found to be much greater at high than at low levels of potassium nutrition.

— William G. Cowperthwaite and W. Rei Robbins

New Jersey, 1948 — 1949

Does the Relative Level of Nitrogen Nutrition Influence the Severity of Boron-deficiency Symptoms in Plants?

Yes. Boron-deficiency symptoms in tomato plants were found to be much greater at high than at low levels of nitrogen nutrition.

— Mark B. Weed and W. Rei Robbins

New Jersey, 1948 — 1949

Does the Relative Level of Phosphorus Nutrition Influence the Severity of Boron Toxicity in Plants?

Yes. Boron-toxicity symptoms (dying tissue on the margins of the lower leaves of tomato plants) were less severe when the plants were grown in sand culture at low than at high levels of phosphorus nutrition.

— Mark B. Weed and W. Rei Robbins

New Jersey, 1948 — 1949

Does the Chlorine of Muriate of Potash Have Any Value to Plants?

Chlorine seems to have very little effect on plants, but there is some evidence that it has value in dry seasons. Station experiments showed, however, that in proportion as the plant took up chlorine, its contents of nitrogen and phosphorus were reduced. In other words, chlorine competes with these elements for a place in the plant.

— Arthur Wallace

New Jersey, 1948 — 1949

The Effect of Lime on Phosphate Rock Availability

Four crops of red clover were grown in greenhouse jars on Tilsit silt loam soil limed to varying degrees in terms of percentage base saturation, and treated with rock phos-

It pays to know what happens to the fertilizer you spread.

Experiment Station Report

Continued

phate at a rate to supply 250 ppm of P_2O_5. These crops were grown and analyzed to determine the effect of liming on the availability to crops of phosphorus in rock phosphate. It was found that yields were increased greatly by rock phosphate applications to this soil until the calcium saturation reached 70 per cent. Above 70 per cent they fell rapidly until the degree of saturation reached about 100 per cent, above which they remained quite constant up to 300 per cent of saturation and averaged only 15 to 20 per cent increase over the check jars.

Phosphorus content of clover in the same jars in both cuttings fell to a low value at about 90 per cent of saturation (pH about 6.0) then increased again somewhat as calcium saturation went up to about 300 per cent. The phosphorus content of clover in unphosphated jars ranged from .075 per cent in unlimed soil to .165 per cent in soil limed to 300 per cent of saturation.

When the lime and phosphorus were applied in different layers in the jar, the phosphorus content of the herbage was fully as high and growth was as good as or better than in those jars where rock phosphate was used above or with lime mixed with all the soil at a rate to give 70 per cent saturation.

Kentucky, 1949

Minor Elements in Limestone and Marl

Spectrographic analysis of chemical composition of limestone and marl was undertaken to reveal the cause of beneficial effects of these materials in stimulating increased crop growth in pure sand culture experiments. The effects noted were proved to be other than those accuring from the presence of calcium and magnesium carbonates. The presence of several minor elements in amounts sufficient to induce luxuriant crop growth was demonstrated. These minor elements included magnesium, iron, cobalt, copper, manganese, molybdenum, zinc and nickel in addition to phosphorus and calcium and other major elements.

The amounts of these elements present varied from mere traces to more than one per cent, depending upon the element and the origin of the sample. Thus, from a practical standpoint, a normal application of three tons per acre of ground limestone includes minor-element materials up to 60 pounds per acre and, if liming is carried out as recommended, sufficient minor elements are added to take care of normal crop needs.

Kentucky, 1949

Mulching

Straw, Sawdust, and Peat Mulches Effective in Conserving Soil Moisture

The value of organic mulches for conserving moisture has been demonstrated in numerous experiments and commercial plantings. Tests at the Ohio Station have thrown new light on several aspects of this problem.

During the growing season of 1948 moisture determinations were made on Wooster silt loam soil mulched with two inches of settled straw, one inch, two inches, and four inches of sawdust; one inch, and two inches of peat; and in cultivated plots. In all of the mulched plots the moisture content of the top foot and of the second foot of soil remained at approximately field capacity during June, July, and August. Soil in the cultivated sections contained 10 to 15 per cent less moisture and approached the wilting percentage on two occasions. One interesting and significant observation is that the soil moisture content remained at a high level in all of the mulched plots regardless of type and depth of material used as mulch.

Fruit growers who practice mulching in berry plantings and orchards should benefit by the results of these experiments. It would seem unnecessary to apply more than a one-inch layer of fine materials such as sawdust or peat if moisture conservation is the basic aim of the mulching procedure. The results also emphasize the great value of mulches throughout the summer in conserving soil moisture.

— *Wesley P. Judkins*

Ohio, 1949

Mulch on Alfalfa Seeding

Frequent observations at the Shenandoah Valley Field Station have

indicated that better stands of alfalfa are obtained by applying a mulch of straw or barnyard manure immediately after seeding. This has been observed particularly on Berks silt loam, which becomes very hard upon drying. A test was started in 1948 to determine the best rate of applying the straw or manure. No results are available from this particular test since the rainfall and climatic conditions were favorable for securing a stand without mulch.

— P. T. Gish and T. J. Smith

Virginia, 1949

Establishing Legume-Grass Meadow Pastures by the Trash Mulch Method

Field trials of the trash mulch method of seeding legumes and grasses have shown the value of the practice on steep slopes where plowing would create an erosion hazard. Trash mulching means preparing the seedbed with a disc, field cultivator or other implement which leaves plant residues (trash) in and on the surface where it is most effective in controlling erosion. The practice is particularly desirable for sloping fields of abandoned idle or unproductive land which have reverted to broomsedge, poverty grass or other wild vegetation. The field trials have shown that an adequate application of lime and fertilizer and adequate preparation are essential to the success of the seedlings. To facilitate early spring seeding, lime and some preparation during the fall prior to making the seeding are recommended.

— H. L. Borst

Ohio, 1949

Mulching Red Raspberries

In the third season after planting Latham red raspberries under treatments of cultivation versus mulching, the yields of 24-pint crates were at the rate of 193 per acre with mulch, and 135 per acre with cultivation. The mulched plants were much more vigorous and showed less disease than those under cultivation.

Kentucky, 1949

Sawdust Mulch Steps-up Blueberry Yields

In seeking the best cultural practices for highbush blueberry growing, the Rhode Island station found sawdust mulch better than straw mulch or clean cultivation plus cover crop, or clean cultivation throughout. In some years during which the experiments were made the use of sawdust mulch doubled the yield. The station found that the temperature of soil under mulches was more or less even. Temperatures under mulch in summer were considerably lower than air temperatures and showed very little fluctuation, while soil temperatures in clean-cultivated plots often came close to the air temperatures and showed very decided up-and-down changes.

USDA, 1949

Orchard Mulches

The Indiana station found that intensive cultivation was not necessary in southern Indiana peach orchards and that sod culture, when supplemented with mulches of hay and straw beneath the trees, was a good practice. Soil erosion was thereby reduced to a minimum and the chemical and physical condition

The experiment stations have found on numerous occasions that mulching is an extremely sound agricultural practice.

of the soil maintained, thus making it possible to grow peaches on rolling areas without unfavorable effects on the soil. The station also learned that, in northern Indiana, on Coloma loamy fine sand, a mulch of manure, soybean hay, or straw increased the availability of soil potassium and corrected potassium starvation of young peach trees, as did applications of muriate of potash.

USDA, 1949

Trash Mulch Culture for Corn

Because of the erosion resistance of a trashy surface there is much interest in so-called mulch culture for intertilled crops, particularly for corn in which erosion is most difficult to control. In current mulch culture experiments, second year rotation sod has been worked up by some implement other than the plow which leaves much of the sod on the surface of the soil. This treatment has been compared with plowing alone and plowing plus topdressing with either straw or manure after the corn is laid by. To date, plowing has produced higher yields of corn than mulch culture preparation with the field cultivator.

Root bed studies tend to indicate that the plowed soil has a greater air content than the trash mulch root beds. Surface mulch when coupled with a well prepared rootbed (straw on plowed soil) produced the best yields.

— H. L. Borst and C. E. Evans

Ohio, 1949

Effects of Mulches on Root-Knot Nematodes

The second year's operations on the mulch plot tests produced differences in plant growth, both cultivated and natural, in yields of broccoli and squash, and in nematode infestations. Plots mulched with forest leaves gave better yields of broccoli and squash than those mulched with miscellaneous plant materials or the check plots. Vegetative plant growth, cultivated and natural, was equally abundant with the two mulching materials, while the growth on the unmulched check plots was decidedly inferior. Nematode infestation was heaviest in squash on the plots mulched with forest leaves. Squash in the plots mulched with miscellaneous materials had the lowest nematode infestation, and infestation in the check plots was about midway between the other two.

— H. E. Bratley

Florida, 1949

This stone mulch is similar in action and effect to organic mulches recommended by the experiment stations.

Wood Wastes Make Valuable Soil Mulches

The value of wood wastes as organic mulches and soil amendments for horticultural crops has been definitely established. Investigations last year were expanded to include a study of the soil-management practices necessary with the use of such materials and the fundamental changes in plant nutrition that occur following their use. The strawberry, which is adaptable to this type of culture, is being used in these tests to measure response to wood mulches.

Previous studies have shown that such wood wastes as fir sawdust, if properly used, make a practical mulch without detrimental effects. If sufficient nitrogen-bearing fertilizers are applied with these materials to compensate for the nitrogen used during the decomposition processes there will be no detrimental effects to the crop and at the same time increased production due to improved conditions for plant growth may result.

The improved growing conditions are not fully understood, but are assumed to be the result of improvement in the physical, chemical, and biological properties of the soil. Future studies are directed toward a better understanding of these factors. The value of wood wastes as sources of organic matter for humus renewal needs to be determined and evaluated in terms of its effects on crop yields.

Oregon, 1950

Sawdust and Shavings as Mulch for Apple Trees

A preliminary experiment to de-

termine the value of sawdust and shavings as mulching materials with two levels of nitrogen application was started at Highmoor Farm, Monmouth in 1946. Yields of the mulched trees in 1948 were higher than those of the unmulched trees, but the difference was not statistically significant. The mulched trees had slightly larger fruits in spite of the fact that they were more heavily loaded. There was no significant difference in yields or fruit size between the two levels of nitrogen application. Several years data however will be necessary before definite conclusions are justified.

—M. F. Trevett and R. M. Bailey

Maine, 1948 — 1949

Insects

Why Is It That Cultivated Blueberries Have Several Serious Pests Now, Whereas During the First 15 Years of Their Culture Virtually No Spraying or Dusting for Pests Had to Be Done?

With the exception of a few minor pests, newly domesticated crops can almost invariably be expected to be pest-free for several years after first cultivation. Blueberries followed that rule. As time passed and cultivated areas became more numerous, certain insects found cultivated blueberries better feeding grounds than wild ones and have increased in number there because of abundance of food. Few, if any, of these pests are new to blueberries; they have merely responded to a more favorable food supply.

— William E. Tomlinson, Jr.

New Jersey, 1948 — 1949

High-Frequency Sound Waves Kill Insects

A branch of physics research — ultrasonics — is about to yield profitable results. A number of stations and the Department are engaged in extensive research in various phases of ultrasonics. For instance, the Pennsylvania station found that high-frequency sound waves will quickly destroy mosquito larvae in a jar of water. Such waves are known to have a killing effect on many insects. They are being studied from the standpoint of their possible use to kill insect life responsible for fruit spoilage such as maggots in fruit being readied for shipment over long distances.

USDA, 1949

Radiant-Energy Traps Studied for Corn Borer Control

The Nation's bill for European corn borer damage to field corn amounted to $103,000,000 in 1948. The Indiana station, in cooperation with the Department, has carried on research aimed at a possible method of corn borer control through use of radiant energy and electric traps that kill the female moth before she deposits her avarge of 400 eggs. During the season of 1947 a field study was made using six narrowband sources of energy to determine the wave length of energy most attractive to the insect. The ultraviolet region between 3,250 and 3,650 angstroms attracted the most corn borer moths. The finding was further verified in laboratory tests made in 1948.

In further intensity studies made in the field in 1948 it was found that higher intensity sources attracted more moths but not in proportion to the increase in intensity. Field tests were again made in 1949 on control, using the ultraviolet sources which radiate in the region most attractive to the moths, and also on intensity. Although the degree of control has not yet been exactly established, results show that there is a definite decrease in corn borer population within a 100-foot radius of each radiant energy trap.

USDA, 1949

Bee Losses From Use of Insecticides

The Utah station tested the effect on honeybees of various chemical dusts used on flowering alfalfa. The insecticides used were three per cent DDT, five per cent chlordane, one per cent parathion, and 10 per cent toxaphene, and were applied during hours when bees were not visiting the flowers. Parathion killed about 40 per cent of the visitors, DDT about 28 per cent, and chlordane 23 per cent. In the tests with parathion two-thirds of the bees died in the apiary, whereas two-thirds of the deaths from chlordane and most of them from DDT and toxaphene took place in the field. The results showed that dusting of flowering alfalfa over a considerable portion of the bee range during a honey flow may reduce the honey yield. If appreciable amounts of these insecticides remain on the alfalfa at harvest it should not be fed to milk cows or meat animals soon before slaughter for human consumption.

USDA, 1949

Animal Husbandry

Activated Sludge for Swine Feed

A shortage of protein supplements during the war led to a search for new feeds. Activated sludge (dried sewage) is reasonably high in protein and rich in some of the B-vitamins. It seemed desirable to check its possibilities as a protein and vitamin supplement for swine.

An effort was made to force two lots of pigs to eat sludge in large and small concentrations. It proved to be both unpalatable and unsatisfactory for swine feeding. These results check with those discovered at the University of Wisconsin except that the Wisconsin workers found sludge to be poisonous to some of their pigs. Sludge is apparently more valuable for fertilizer than for swine feed.

Michigan, 1948

Is It True, As Has Been Reported, That Male Chickens Can Be Fattened More Rapidly by Giving Them Female Sex Hormones (Estrogens)?

Experiments here show that the fattening effect is slight. Treated males gain only slightly faster.

— Paul D. Sturkie

New Jersey, 1948 — 1949

Experiment Station Report

Continued

Can Male Birds Be Caponized with Estrogens?

No. When administered to a male, estrogens cause the combs and testes to decrease in size and the comb loses its red, waxy appearance. The bird tends to look like a capon, but *it is not a capon.* As soon as the treatment is discontinued the bird will begin to take on the behavior and appearance of a normal male.

— Paul D. Sturkie

New Jersey, 1948 — 1949

What Other Effects do Estrogens Have on Males?

Estrogens do improve the market grade or quality of the carcass even though the amount of fattening is increased only slightly. For example, males that normally might grade C or B might be made to grade B or A after treatment with estrogens.

— Paul D. Sturkie

New Jersey, 1948 — 1949

How is the Hormone Administered?

In the form of a pellet, which is implanted under the skin of the neck, where it is absorbed within four to six weeks.

— Paul D. Sturkie

New Jersey, 1948 — 1949

How Much Does it Cost to Treat One Bird?

The pellets cost about three cents apiece. One pellet will treat one bird for four to six weeks.

—Paul D. Sturkie

New Jersey, 1948 — 1949

(In the opinion of *The Organic Farmer,* the practice of "caponizing" roosters with hormones is not to be recommended, at least until a great deal more work is done and there is definite proof that artificially caponized roosters are not defective in any way.)

How Well do Turkeys Harvest Sorghum and Sunflower Seed?

Growing turkeys were used to harvest a plot of grain sorghum and one on which both sorghum and sunflowers were grown. The sunflowers used were a short-stemmed variety.

There was no apparent difference in the rate of growth between the turkeys fed on the sorghum alone, and those fed on the combination of sorghum and sunflowers. Each lot received a standard growing mash in troughs in addition to the standing grain.

This year the amount of sunflower seed eaten by wild birds seemed to be rather high. The loss of sorghum from this source did not appear to be great.

The stiff stalks of the ripened sunflowers, and the height which they attained made it necessary to break down some of the stalks so that the turkeys could make use of the seed. The sorghum stalks were flexible enough so that the turkeys had no trouble in harvesting the grain from the heads.

South Dakota, 1949

Toxicity of Cottonseed Meal to Swine.

Pig feeding trials with various rations containing cottonseed meal as the protein supplement showed that young animals are much more susceptible to gossypol, or cottonseed meal poisoning. The source of carbohydrate is evidently important also, as few deaths occurred in lots fed on rations containing barley as the principal carbohydrate; while heavy losses were incurred in lots where white corn or wheat were used.

Contrary to conclusions made by another investigator years ago, cottonseed meal in the ration did not lower the oxygen carrying capacity of the blood of pigs to a dangerous level. It also caused only a slight anemia. Evidence was obtained which supports the opinion of Russian workers that the toxicity of gossypol is largely due to its action in increasing the permeability of the capillaries and the production of hemorrhages.

Georgia, 1948 — 1949

Rooster or Capon? More experimental work on hormone caponization should be done before the method is unqualifiedly recommended to poultrymen. It should be determined if there is any risk to the health of persons eating such capons.

A Healthier Culling Policy

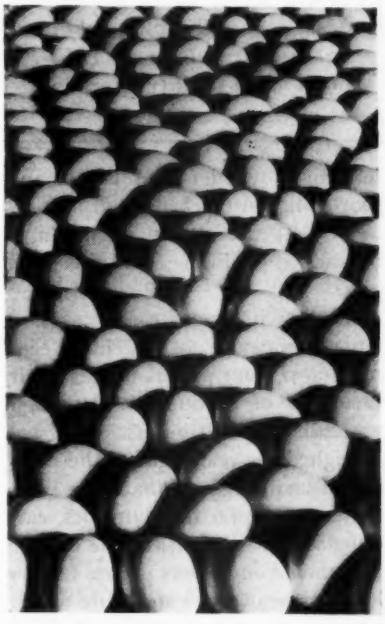
The poultryman should strive for more than just high egg production.

By THOMAS E. JOHNSTON

"CULL your poultry flocks," experts in the poultry business advise. "Take out all low producers."

These words of advice are often repeated and some poultrymen seem to take the position that the business demands that a series of cullings hound the chicken from the egg shell to a premature grave. There's a well developed technique in culling eggs for hatching, and culling breeders that lay eggs for hatching. Following this train, we may trace the process backward or forward through the generations, perhaps winding up by asking ourselves that ancient brain teaser, "Which came first, the chicken or the egg?"

The poultryman's own point of view, however, determines the goal toward which his culling moves, and indeed whether it moves toward a goal at all. Does he cull to substitute the stew pot for the grave, or is his view toward the living and toward improvement of the health of the living? The quest for healthy individuals and investigation of their means to health has been emphasized again and again in the works of Sir Albert Howard. Avoiding a morbid obsession with the dying and death and determining why they were sick or had died, Howard continually studied healthy plants and animals to learn their formula for abundant health and vitality. This constructive point of view represents one which poultrymen may emulate with satisfaction and profit.



An egg isn't always a good egg. The age of the chicken that laid it is a big factor.

Culling, in the full implication of the word, actually means selection. In establishing his point of view toward selection a poultryman should avoid several pathways which will mislead him into pitfalls. This article proposes to point out some of the pitfalls of several of these pathways and to suggest health and ability to live as fundamental bases of selection.

Culling for Egg Production

Separation of laying hens from those which are not laying constitutes a widely held idea and practice in culling. The hen's external appearance forms the basis for a scientific guess as to whether or not she is laying. A sparkling eye, a ruddy face, and a large red comb, especially among breeds of the Mediterranean and American classes, bespeak activity of the ovary and other internal organs of reproduction. Along with these facial signs, the laying hen has a wide spread between the pubic bones and the keel bone, as well as ample space between the pubic bones themselves. These signs generally tell the mere

A Healthier Culling Policy

Continued

fact of production, whether the hen happens to be producing an egg or two per week or an egg every day. The hen which lays at high intensity, however, loses yellow color from her beak, legs, and skin more rapidly than does the hen laying at a low rate of intensity. Similarly, a hen which has been in continuous production for a longer period of time will have lost more color from these pigmented parts than a hen which has laid but a short time. Taking bodily appearance and color together and considering the plumage of the hen along with these, many poultrymen learn through experience to make a rather shrewd appraisal of a hen's production over a period of time, sometimes being able even to date the history of her pauses and fresh starts in production.

It may be seriously questioned, however, whether culling upon the basis of egg production alone forms an adequate basis for selection. Too many important considerations are completely overlooked in the practice of this method. In the matter of egg production, for example, this method fails to consider quality of eggs produced. It naively assumes that an egg is an egg, and that all of them are uniformly desirable products. This assumption is far removed from fact. Eggs are extremely variable in every characteristic, inside and outside, including such characteristics as quality and nutritional value. Their interior quality varies extremely, from those which are "fresh," well flavored, and highly edible when laid, to those which are internally moldy and decayed and thus inedible. It is interesting to note that defective eggs, including those with blood spots, occur more frequently as hens lay with higher intensity.

Add to these inadequacies a complete blindness toward the power of the product to transmit life and health and you will begin to see why culling hens mainly on the basis of numbers of eggs produced leaves so much to be desired. Such culling takes no account of life span; on the contrary, in current practice pullets in their first year lay the bulk of all eggs produced on commercial poultry farms. While the normal life span of a chicken covers several years, our eating eggs come from hens, which, by the heredity, feeding and management to which we subject them, have a life's expectancy of a year or less. Such a standard of selection carries with it a tendency toward poorer health and shorter life of chickens with a possibility that the same tendency may be carried to human consumers of eggs.

A Point to Remember

Dr. G. T. Woods of the Illinois College of Veterinary Medicine warned recently against keeping old hens too long. "They often have tuberculosis," he emphasizes, "which they spread to young birds and to swine. Most pullet flocks have little or no tuberculosis and will lay more eggs than hens on less feed." The solution to the age problem in poultry obviously is a compromise. Mature hens do produce better eggs, especially for hatching, but be careful to get rid of them when senility approaches.

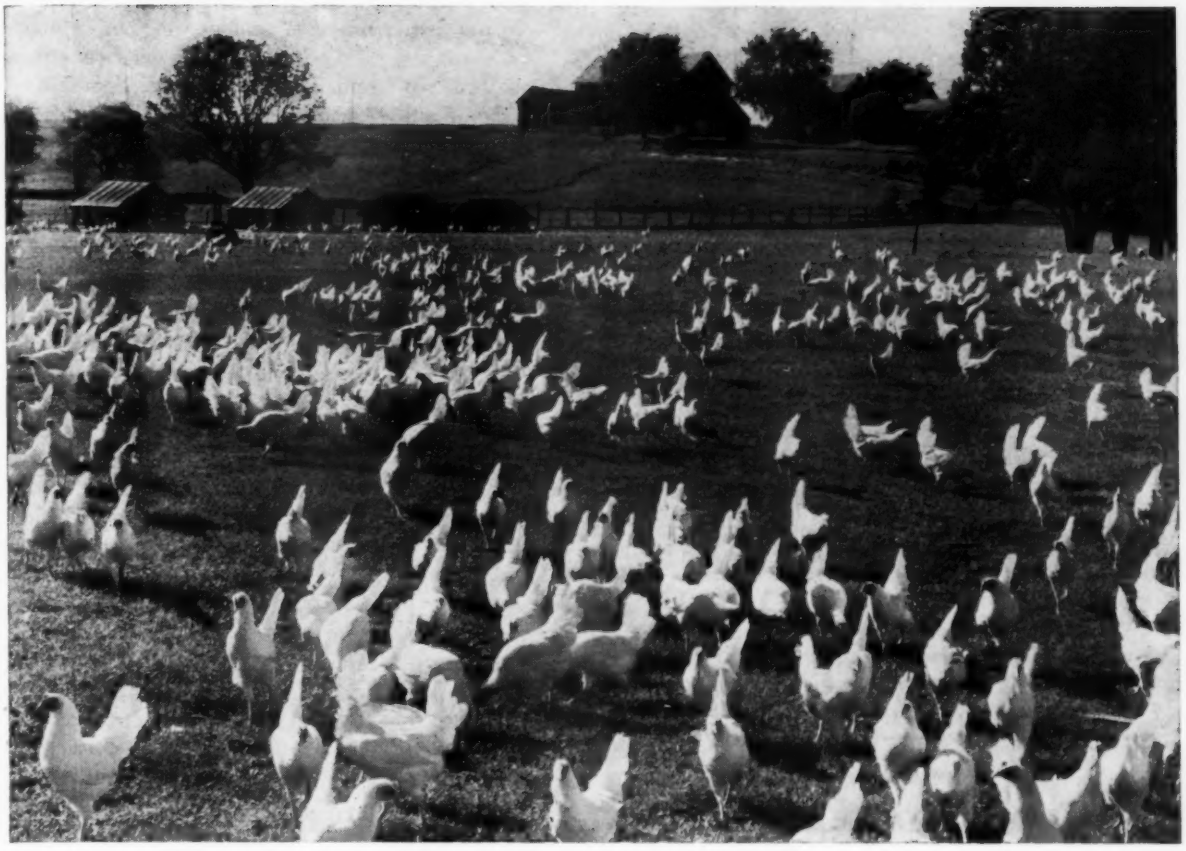
Along with most eating eggs, a large percentage of hatching eggs come also from pullets during their first year of production. Although professors of poultry husbandry have inveighed for years against the practice of saving eggs for hatching from pullets, this practice continues, carrying with it the inescapable danger that these young hens possess factors for poor health and short life which they will transmit to their offspring. Almost all broilers are hatched from pullets' eggs, a practice countenanced upon the premise that broilers need live only thirteen weeks anyhow. Since this is their life expectancy, why should anyone be concerned about hereditary or environmental factors for short life which they carry? This point of view might be valid if it did not completely ignore the possibility that factors favoring poor health and early death may pass, not to the broilers alone, but to people who consume some millions of pounds of broiler meat every year.

Selection of stock for broiler production, in order to maintain mass operations, has been founded upon selection for high egg production described earlier in this article. In addition the stock is selected for quantity of early fleshing, rapid early growth, and early, uniform feathering. While these factors contribute to efficiency of processing and handling the product, they also overlook the variable quality and nutritional value of the product.

What can Poultrymen Do?

Many possibilities exist by which the poultryman can manage and select his flock toward higher standards of health and livability. The matter of food is all-important. Chickens need contact with organically-managed soil and the many health promoting foods which grow from it and live within it. It has been argued that hens won't eat so much highly concentrated food nor produce so many eggs if they are on range as they will if they are confined to a laying house and forced to eat a highly stimulating diet. We may question this argument on at least two points: (1) Has it been demonstrated that forcing the last possible egg from a hen benefits the hen, the quality and flavor of the egg, or the customer? (2) When costs have *all* been carefully computed, is it not more economical to handle hens more naturally, even at the sacrifice of a part of the egg production of any one year?

After a flock has lived and pro-



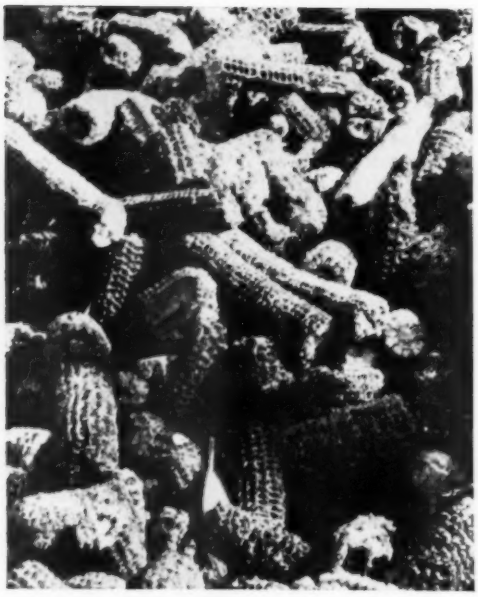
Don't rely on pullets to supply hatching eggs. Eggs from chickens that have been through the mill are usually of higher quality because the weaklings have been weeded out.

duced eggs for one year and begun to slacken in production, it might be well to set aside a percentage of its members, probably not a large percentage at the beginning, as possessing sufficient health and vitality for another year of production. These will form the basis for a longer lived flock in following years and inaugurate a healthier point of view toward culling in the mind of the poultryman.

A discriminating and health-conscious public already exists and can be found in many neighborhoods as prospective buyers of products made by natural, healthful methods. Suppose an organic farmer could truthfully advertise that "Healthy hens in the prime of life produce our eggs." Certainly he would have ample ground upon which to build a convincingly truthful selling appeal, backed up by an exhibit of a healthy flock of hens which live and lay eggs into their second, third, or fourth year.

It would be perfectly in line also for the organic farmer to produce fertile eggs for hatching and offer the excess not needed for hatching to his customers as eating eggs. In offering such eggs for eating purposes, the poultryman should pointedly advertise them as fertile eggs. Such sales appeal will gain adherents as consumers learn that the principal advantage of the infertile egg favors the mass producer and merchandizer of eggs rather than the consumer who has been neatly duped into believing that infertile eggs (really incomplete eggs) somehow benefit him. The infertile egg actually doesn't keep better or last longer than the fertile egg; it merely fails to show symptoms of age and deterioration as quickly under bad handling, and thus escapes detection. Of what advantage is this to the consumers or the producer if the latter is really interested in selling a quality product?

The farmer who has given attention to the livability and health of his flock faces a similar opportunity to appeal to the quality market in selling broilers or other meat chickens. The consuming public will equally enjoy eating eggs, broilers, or roasting chickens produced from a flock having vitality enough to carry them through more than one year of life. And the best selling point of all will be that his products have superior flavor and eating quality! The poultryman can confidently appeal to the buying public upon the health merit of his products, after which flavor and high edibility will bring in repeat business as well as initial sales.



Gathering organic wastes pays off.

Soil Building Opinions Differ

By WILLIAM P. COLEMAN

A GOOD many men consider themselves to be good farmers because they keep their cultivated crops clean, feed well and manage to show a profit at the end of the year. This is good farming, without a question, because it takes brains as well as brawn to farm profitably.

But the so-called good farmer isn't always good to his land, because regardless how much manure he has there is never enough for all the crops. Manure is usually spread most generously on the corn ground or on the piece that will go into potatoes next year. The new seeding or the cereal grain crop will receive a light top dressing if manure is available, but more often it gets along without it.

One of these good farmers smiled with amusement when I suggested that some fields have a rotation of green manure crops to make the manure go farther. He has seventy acres in alfalfa or alsike and June grass, twenty acres of which are mowed for his own use and the balance is baled and stored in the large barn until it becomes more valuable during the winter months and is then sold to neighbors.

"I'm building up my land," he said, "and have been doing that for a good many years. I grow all the hay I can and of course everyone knows that alsike and alfalfa are great soil builders. They put nitrogen into the soil and when I finally plow the fields, I have all the roots with their bacteria nodules to return to the soil.

"It's a waste of good feed to plow a nearly mature crop into the soil, for there are always feeders with more livestock than they can feed from their own places. The next best thing to taking off the hay is to pasture the field and have the droppings and urine right on the ground, but cattle would waste too much. No, I think I'm on the right track."

Some of his neighbors claim that this used to be a much better farm before he went into the hay business. They usually refer to him as "Miner" Brown instead of Farmer Brown and say that with his system he is mining the plant food and organic matter out of his soil. And he undoubtedly is.

This Miner Brown takes off two cuttings per season and his fields produce for three years before turned in. He averages three tons per acre which makes a total of approximately nine tons of vegetation per acre or four hundred and fifty tons removed from the fifty acres. Think of the plant food alone that is lost to the farm, not to mention the nitrogen locked up in the stems and leaves. And that is supposed to be good farming.

Another man who believes himself to be about the smartest thing that ever came down the pike, raises rye and vetch in combination for seed.

There is a very good demand for his product and he always sells out shortly after harvest.

"Best soil builder you can find anywhere," he says, "and some of my customers say they'd be lost if I ever quit raising it. It's building up my place, too, with the vetch putting nitrogen into the soil, the ripe straw and vines left on the land by the combine and all is returned into the ground after harvest.

"I'll never go into any other kind of farming because raising rye and vetch for seed pays well, it isn't too hard and I don't have a lot of cows to milk or hogs to slop. I plow, harrow, drill and then sit down. The combine comes along and does all the hard work, and then I'm through for the season.

"In the meantime, my dairy farmer neighbors are sweating their heads off cultivating corn or potatoes, husking or cutting corn, harvesting hay and mowing it on the most unbearably hot days. No, I wouldn't trade with the best of them."

This man does more for his farm, but the dry matter returned to the soil can never compare to green, succulent crops that will decay within a week or so and release plant foods. Bacteria go to work immediately on the succulent vegetation; so do earthworms and other forms of life that engage in the soil building process.

"When I get a little money ahead, I'll put in crops to plow under," said a day dreaming tiller of the soil. "Out in North Dakota one year I worked for a wheat farmer who planted his crop on a clover sod, so I know what organic matter will do. We used to take a whole shock of wheat on the fork and toss it into the bundle wagon, but on his field the straw was so long and the heads so heavy, we were glad to fork a bundle at a time."

From the porch you could look over a field that I estimated to contain about thirty acres, now waist high with ragweed, daisies, wild mustard and other weeds.

I said, "I saw a field like that plowed down before it could seed, then put into rye for a fall and winter cover crop. The next spring was too dry for plowing so after pasturing one day it was decided to let the grain ripen. The rye made a thick stand before winter set in and the pasturing was so brief it was hardly noticed. I forget what the grain yield was but it was far above average, and I give all credit to the weeds put down for an organic crop."

"That could be," this farmer replied, "but just the same there is nothing to compare with the legumes as soil builders. I want to have a definite part of the farm in vetch or sweet clover each year to plow down for the corn crop or wheat or barley. Then you'll see some bumper crops around here."

Any weed crop is well worth turning under for the organic matter and the plant food it has robbed from the soil. Turning under is much better than letting the crop stand, seed and die and then disintegrate above ground to be blown all over the countryside by whipping fall and winter winds. Weeds are not the equal of legumes, but they are considerably more than half a loaf. They are succulent when green and provide a tremendous volume of organic matter for small grain or other crops that follow.

Anything of organic origin that is put into the soil will be beneficial. I know a farmer who some years back carted countless tons of asparagus butts from the canning factory to spread on his light sandy soil. He brought his own crop to the factory in a three-quarter-ton truck, and returned home with a full load of waste butts that were succulent and green.

After six or seven years of this procedure the light soil was brought up to the point where it would grow good crops of rye and vetch or clovers. Once the soil was given some body, it began to produce much more bountifully and thus furnished more residue to be turned under. Once a liability to the farmer, the land now in good tilth became a pleasure to work and there was an assurance of good crops because of the increased water holding capacity.

We watched a farmer with a huge rack trailer coupled behind his car pull away from the elevator with sixty gunny sacks of ground cobs.

"Boy," said one of the bystanders with a laugh, "when I get so poor I have to take free corn cobs and spend ten cents a hundred to have them run through the hammermill, I'll give up farming. What that guy should have is all the cows he can run on his place and put their manure instead of corn cobs into the soil."

"I'll say," said another. "Time he figures up what he paid out for grinding, his gas and his time, he'll feel mighty sick. I'd just as soon dump so much gravel on my place as ground corn cobs, and there's just about as much good in it."

But this corn cob farmer wasn't so dumb after all. There is considerable nutrition in ground corn cobs as many cattle feeders have learned. There is also organic matter and plant food for which all soil longs. But this farmer used the ground corn cobs in the cattle barn gutter and in the rear of his horse stables and as litter in the laying house. It would have been good for the soil in its original state, but its effectiveness was greatly increased when mixed with the various manures and the urine it absorbed.

One of our neighbors used to cut marsh hay with a scythe and draw it to his farm for use as bedding and ultimately to plow under. Marsh hay is tough material and slow to decay, but it did make his ground more productive.

Another mowed the roadside along his farm, the fence rows and lane and all of this material was spread on a field soon to be plowed. The cuttings from his lawn and raked leaves in the fall all went on the manure heap to help swell the organic content.

Usually the man who wants ideal

(*Continued on page* 55)

Miscellany

By J. I. RODALE

General Eisenhower and Nutrition

I always knew that General Eisenhower was nutrition-conscious as far as health was concerned. I remember during World War II an item appeared in a newspaper about him in which he said that in the officers' mess in France when the others were rushing for the meat he tried for the bones. He was wise. In our refined modern diet we do not get some of the extremely valuable minerals which are contained in bones. On March 23, of this year, Eisenhower gave an address at Columbia University dedicated to the cause of international peace in which he said something that should be taken to heart by those who are concerned in producing the world's food. He said:

"So far as the world's food is concerned, all peoples must learn together to make proper use of the earth on which we live. Hovering even now over our shoulders is a specter as sinister as the atomic bomb because it could depopulate the earth and destroy our cities. This creeping terror is the wastage of the world's natural resources and, particularly, the criminal exploitation of the soil. What will it profit us to achieve the H-bomb and survive that tragedy or triumph, if the generations that succeed us must starve in a world, because of our misuse, grown barren as the mountains of the moon?"

At a time when the future looks so grim both in the field of international peace and in the well-being of the bodies of men, why is not enough being done on a large scale in all the agricultural colleges to find a better way to grow our food and to prevent soil erosion? It is a good sign, however, when a man as prominent as General Eisenhower speaks up about such a matter. I hope he will go further and use his influence to start a specific project in this field.

Soil Softening

When we first purchased our farm about ten years ago, we noticed that after a rain the water would stand in ponds at places where there were bowl-like formations of the ground. After about two years of practicing the organic method and using animal manures I noted that this condition was cured. The rains were absorbed immediately into the ground, showing that something was accomplished by the organic method which transformed the structure of the soil and opened up its pores. Standing water causes an anaerobic condition — a lack of air — which brings about the multiplication of the wrong kind of bacteria, injuring the soil.

I have seen such low places in the fields on neighboring farms where the water repeatedly stands whenever it rains hard. I call these spots field ulcers. The crop grows very poorly at such a place. I have seen a field of oats growing and in such low places nothing was growing. These places stood out in the field like sores.

Now why am I writing all this? Because one swallow does not make a summer. One case like mine does not mean much, but now we have another case. Several years ago my brother Joe purchased a farm near ours and I noticed several places on it where the water would stand after a heavy rain. I brought it to his attention.

"Joe," I said, "after two years of organic farming you will not have this condition."

This year has been an exceptionally rainy one and for the first time there were no standing ponds on his farm. In only two years of organic practices his land has undergone a complete change. His soil now drinks in the water immediately. This action is very important on these parts of our farms in which the soil slants. The rain used to wash off there into the ditches carrying valuable topsoil with it in expensive erosion. There is much less of it now on Joe's farm. On our place, in addition to the organic method, we practice contour farming, and between the two methods do not lose a thimbleful of soil in rain erosion.

Bees Too Few

John C. Davis, writing in the *Cleveland Plain Dealer* of June 25, 1950 says that "Ohio's bee population is down 20 per cent over a three year period with resulting losses in the legume seed, fruit and vegetable crops." He quotes Carl Deeds at the fourth annual field-day of the Lorain Beekeepers' Association, held at the Wellington Fairgrounds at Cleveland, as follows:

"'Beekeepers maintain, and with much merit in their claim, that they receive only five per cent of the value of their work when paid only for the honey and beeswax produced by their bees,' Deeds explained. 'The remaining 95 per cent of the value is in the pollenizing work done by the bees as they go from blossom to blossom gathering nectar. Without this pollenization, fruit and vegetable blossoms would just be pretty flowers. They would not bear fruit.

"'But it is in the field of legume seeds that we are really short in bee population. With the emphasis on soil conservation, the need for seed is the greatest in our history. We will take some 27,000,000 acres out of row and small grain cropping this year, and these should be put into legumes for the good of the land—if we had seed.

Wild Bees Too Few

"'Time was when wild bees furnished all the fertilization needed for our clover and alfalfa fields, but that was before we had so many acres and *before the present wide use of poisonous sprays on field crops.* The wild bee population just cannot do the job today, and the answer to greater legume seed production is more domesticated bees that can be moved from field to field at blossoming time.'"

Experiments at the Wooster Ex-

periment Station in Ohio have demonstrated than an ample bee population working in the field can increase seed production from two and a half bushels to the acre to twelve bushels.

Weed Killers Weakening

Just as certain strains of flies are becoming tolerant to the effects of DDT so is a certain weed gradually becoming immune to the weed-killer 2,4-D. This weed is called Johnson grass. The following from *Science News Letter* of July 22, 1950 tells part of the story:

> The discovery was made by Leo Hebert, plant scientist at the Department of Agriculture's sugar crops laboratory at Houma, Louisiana.
>
> The weed with growing immunity to 2,4-D is called Johnson grass. When sugar cane fields were first treated with the chemical, nearly all of the Johnson grass was killed. From the few surviving plants however, the government sugar scientist saved seeds.
>
> "This year his suspicions were confirmed. Second-generation seedlings, offspring of the hardy plants which survived the first dose of 2,4-D, were found to be twice as resistant to the weedkiller as plants of the previous generation."

Other ways to control weeds than with chemicals must be found because with them there are always hidden dangers. No one knows what harm to the microbial life of the soil is being done with these chemicals. If they have the power to kill weeds they are detrimental to the well-being of the soil in general. 2,4-D killed an entire crop of sweet corn of one of our neighboring farmers. A neighbor's spraying of it last year damaged our grapes. The item in *Science News Letter* quoted above finishes off with:

> "It now appears that chemical weed control is another field in which science must always look for something new, just as it has had to do in the fight on house fly strains showing resistance to DDT, said the glum official announcement of the Johnson grass discovery."

We are controlling the weeds on our farm pretty well with our cultivating tools. The trouble with many farmers is that they are depending too much on the chemist to produce magic for them. There is wonderful magic in a soil kept free of strong chemicals of any kind.

The Grange and Chemical Fertilizers

Recently Congress passed a resolution to appoint a congressional committee to investigate the use of chemical fertilizers. The National Grange in November, 1949, did the same thing, preceding Congress by about six months. Here is the resolution of the National Grange which is taken from page 164 of the *Journal* of the 83rd Annual Session, November 1949:

"INVESTIGATION OF ORGANIC AGRICULTURE"

"Whereas, The practice of organic agriculture as pioneered by Sir Albert Howard, Ehrenfried Pfeiffer and others is gaining thousands of adherents throughout the world; and

"Whereas, the proponents of organic agriculture claim to have a practical method of developing natural soil fertility which they declare to be the only basis for maximum health of plants, animals and humans; and

"Whereas, it is claimed that the present practices of agriculture, employing commercial fertilizer and poison sprays could be responsible for virus diseases;

"Therefore, be it resolved that the National Grange ask investigation of the above claims for organic agriculture by State and Federal agricultural agencies. —Adopted"

Congressional Investigation

Here is a letter that was reproduced in the *Congressional Record,* of June 19th, 1950, page A4754, and speaks for itself:

Fertilizer Investigation
EXTENSION OF REMARKS
of
HON. ROBERT L. RAMSAY
of West Virginia
IN THE HOUSE OF REPRESENTATIVES
Monday, June 19, 1950

"Mr. RAMSAY. Mr. Speaker, a letter recently written by Mr. Fred H. Gaston, Alpine, Tex., to Mr. William G. Holman, Washington, D. C., contains some statements that strongly support the effort now being made by the Honorable ADOLPH J. SABATH to secure the appointment of a special committee to study the health and economic phases of present methods of fertilizer manufacture, House Resolution 323.

"Some of the statements made, and sworn to by Mr. Gaston, are so serious in their implications as to incline me to ask that this letter, and Mr. Gaston's affidavit, be inserted in the RECORD for the

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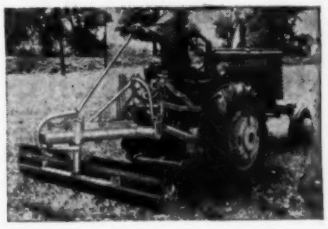

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BRULE VALLEY NURSERIES, Brule, Wis.

Miscellany

(Continued)

information of other Members of Congress.

"Mr. Gaston's letter reads as follows:

Alpine, Tex., June 15, 1950.

Mr. WILLIAM G. HOLMAN,
Washington, D. C.

"DEAR MR. HOLMAN: I was glad to receive a copy of H. R. 3045. I believe the time has come to subject chemical fertilizers to more rigid regulation.

"I have read your paper with considerable interest and am surprised to learn that the Federal Government has allowed a few fertilizer manufacturers to acquire a monopolistic control of the phosphate market, and that the leasing of public lands on which are found the principal potash deposits, to a few corporations, has enabled them to acquire control of 80 to 90 per cent of the potash in this country.

"I fully agree with you that 'monopoly is in the saddle, booted, and spurred,' and that the farmers are completely at the mercy of these ruthless corporations. Although the biggest potash mines in America are almost at my very door (on Government land, obtained at negligible cost), my letter to the big plant near Carlsbad, contemplating car lot purchases of potash, had to be forwarded to Wall Street before I received the following reply:

"Our entire production of potash for the year June 1, 1950, to June 1, 1951, has already been committed.

"I have discovered that in irrigated fields, the increasing use of artificial fertilizers has reached a point where the costs wipe out the potential profit. Moreover, the land, like a user of narcotics, requires larger dosage from year to year, to maintain an average yield. Such artificial stimulation is attended by actual soil depletion and destruction of the original topsoil, accompanied by development of hardpan. Earthworms and subsurface animal life — the bacteria and countless microorganisms which build humus and preserve tilth — tend to disappear entirely with the continued use of strong chemicals. Thus our soils are being ruined by chemical fertilizers.

"Let me know whether any Texas Congressmen are opposed to H. R. 3045 and what I can do to help your worthy undertaking.

Very truly yours,

FRED H. GASTON."

Potato Farms and Dead Cows

An item appearing in the Suffolk County *Farm Bureau News* for July 1950 is extremely significant. Part of it reads as follows:

"Several cows owned on potato farms have died recently, but cows have died regularly on potato farms for years. These 'family' cows calve and go down and cannot get up. Treatment helps many of the younger animals but cows over five years of age respond less favorably to treatment. Of the animals that have died, which have been autopsied, all have shown the same condition of liver degeneration. The condition has never been observed in a commercial dairy herd.

THIRD ATTACK USUALLY FATAL

"Cows that have one or two attacks, and have recovered seldom pull through the third time. Some die the first time afflicted, but it is not an infectious or contagious disease. It is believed by one veterinarian to be due to the fact that these cows are pastured on rye and other crops grown on soil that has been potato land for years. Many gallons of copper sulfate, calcium arsenate, lead arsenate, weed killers, dithane, DDT and other poisons have been used."

Night Growing

The following little article appeared in the *N. Y. Times* of July 16, 1950:

"The statistical experts who have been telling us for years that the world faces starvation because the population is increasing faster than the food supply do not impress Dr. Fritz Went of the California Institute of Technology.

"An increase in basic knowledge of plants, improvements in agricultural methods and extension of cultivated areas could increase world food productivity 20 per cent in his opinion. The estimate is based on a year's patient plant experimentation under the most exactly controlled conditions of weather, light, temperature and sterility in six air-conditioned greenhouses and thirteen air-conditioned laboratories.

"Night light and temperature have a particularly beneficial effect on the plants. In Hawaii, night-lighting increases the yield of sugar cane by a considerable percentage. Under ideal conditions the yield of an acre of sugar beets may be doubled or trebled.

"Until recently, it has been thought that growth of flowers and plants is controlled by daylight conditions of light and temperature. Dr. Went finds this to be untrue. Night temperature is just as important. Some plants, for example, grow only when the temperature is under 50 degrees at night; others, when the temperature is above 50. Tomato plants grow almost as fast at night under controlled temperatures as they do in daylight."

Is it possible that plants need a rest from growing at night? They may become fatigued without it. Animals require sleep at night. Man has forced hens by means of artificial lighting to work over-time, but has not succeeded in making them lay more eggs per year. Have poultry scientists ever made comparisons in

the health between chickens so forced and others who work only by daylight?

When plants do not grow under natural conditions they must suffer in some way, sometimes in ways that are so subtle that it is difficult to notice. For example, a plant growing under ordinary conditions will occasionally sway with the breeze. That movement may be good for it and may be similar in effect to exercise taken by human beings. In a hothouse, the same plant will get very little movement because of lack of breeze. That may be one of the reasons that hothouse plants are what they are — namely hothouse plants, and come down with more ills.

Man is becoming more and more reckless and is going more and more away from nature. Some day he will pay for it.

Cows die from food growing in soil that has received much poison spray, but what about people who eat such food? Today the public is exposed to an enormous amount and variety of foods that carry dangerous amounts of poison spray residues. Does the farmer's conscience bother him when he sends such food crops to market? The condition is a fearful emergency but farmers and agricultural scientists are going about spraying poisons, and acting calm about it as if nothing is wrong. There is much evidence that the need for spraying can be greatly reduced if more organic matter were used as a fertilizer. This is not just hearsay or wishful thinking. There is actual evidence of it, but no attention is paid to it in agronomic circles. Already the cost of applying sprays so frequently is becoming prohibitive in cost and soon an economic dead end will be reached. It is later than you think.

Baby Foods

There are several brands and many varieties of baby foods on the market. I can see a wonderful opportunity for some large company or group of individuals with sufficient capital to go into the business of producing such food organically. There is a tremendous waiting market. Nothing is too good for our babies, the future citizens of our country. The public will embrace such a project enthusiastically and will buy all that can be produced. Babies first.

Cancer Clinic

In Dallas, Texas at 4507 Gaston Avenue, is a Hoxsey Clinic, which has cured hundreds of cases of advanced cancer. I have one friend who was cured there. This clinic has won a court case by which an attempt was being made to stop them from operating. The judge ruled that they were actually curing advanced cancer cases. The reason I am mentioning all of this here is that Mr. Harry M. Hoxsey who manages this well-run institution has asked me to send out a call for organically grown foods to be used at his institution, so I am asking all readers of *The Organic Farmer* who have farms and who are interested in this matter to please get in touch with Mr. Hoxsey. It is in an extremely worthy cause. The address is given above. At any rate send for their booklet which shows pictures, cases and names of people they have cured of cancer.

Sprayer Tragedy

The following is a little item from the July 14, 1950 issue of the Allentown *Morning Call,* Allentown, Pa.:

"THE WRONG SPRAY: The Trinkle home on S. 12th St. in the 19th ward wins much favorable commendation from passersby. Adolf and Theresa like pretty flowers, lawns and shrubs and they see to it that they have them.

"Next to the house there is a small fruit orchard, mostly apples. The trees are kept in fine condition; the trunks are even whitewashed.

"It is not a blight that caused the leaves on the apple trees to turn brown. Theresa thought a little spraying would not hurt and accidentally she got hold of the weed killer."

Chemical fertilizers, poison sprays and weed killers are dangerous to the people who eat the food so grown, to the men who grow them and to the families of those men.

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Memos To Farmers

Industry Controls Much Agricultural Research

A CONDITION exists today in many agricultural experiment stations that is harming the farmer. That condition is the sponsoring of research by gifts of money and supplies from industry.

Absolute scientific truth is an elusive thing. It can only be obtained by a corps of men unfettered by bias. Objectivity in research can not be obtained when that research is being paid for by an agency with a vital interest in the nature of its outcome.

To illustrate my point let me quote from the recently issued sixty-first annual report of the Georgia Experiment Station:

"The Georgia Experiment Station wishes to acknowledge the financial assistance given by the organizations listed above. (Among the listed organizations are the Chilean Nitrate Educational Foundation and the American Plant Food Council — both representing the chemical fertilizer industry.) This assistance aided materially in furthering research work in specific fields of endeavor. Research work accomplished in cooperation with these organizations not only aids them in their work, but is beneficial to all Georgia farmers.

"This station also recognizes those organizations who donated material and equipment to aid research work. Without this aid and cooperation, certain research would have been impossible."

Of course, many farmers have benefitted by research that depended for its financing on some industry serving agriculture. But the possibilities for harm to agriculture by the industrial grant system are great and, by their nature, difficult to bring out into the light. At least one prominent experiment station recognizes this danger and refuses to accept *any* aid from non-academic sources.

But the solution to this problem is not the cutting off of all aid from industry to the experiment stations. That would result in a loss of the good things brought by this system as well as the bad. The ideal but apparently distant goal is a balanced program of research subsidization — including funds from anti-chemical quarters — encouraging the experiment stations to tell both sides of the story.

Avoid Continuous Wheat Cropping

Organic farmers who are interested in reducing disease problems to an absolute minimum should follow the Ohio experiment station's advice not to plant wheat on land that produced a wheat crop this season. Continuous wheat cropping allows a fungus, known as Take-All, to build up on the roots.

Wheat is particularly likely to get this disease, caused by the fungi overwintering on the straw and stubble of old plants. The young wheat plants so infected will either die or be seriously weakened.

If you had planned to plant wheat on wheat land this fall, it would be most advisable to substitute a fall cover crop.

Garbage Composting Industry Is Expanding

A recent issue of *The Engineering News-Record* reports that the city of

Toledo, Ohio, will enter into a contract with the Toledo Frazer Compost Co. to erect a plant to handle 6,000 tons of garbage yearly, about one-fifth of the city's output. It is estimated, reports the *News-Record*, that the city will save $40,000 a year in trucking and incineration costs.

Invest in a Wood Stove

An article on wood burning stoves that we ran in our January, 1950, issue has aroused more comment over the months than almost any article we have ever published. People still write to us asking where they can buy wood stoves and telling us how much they like the idea of making use of on-the-farm fuel.

Wood stoves have an advantage that may not be apparent at first glance but is important nevertheless. That advantage is that wood ashes are an ideal potash fertilizer. One winter's use of a wood stove can mean the production of enough potash to supply a large truck garden and perhaps enough for a small corn field.

One stove we know of is designed to burn sawdust. Of course, burning is not the best way to convert sawdust into fertilizer, but the practice can be condoned if one can cook one's meals in the process.

Need a Job?

Every once in a while someone writes to us and wants to know where they can find farm help that really understands and is in sympathy with the organic method. All too often we have to tell them that we don't know of anybody offhand who can fill the bill.

Now, if you know farming – organic farming especially – why not write to us giving your age, experience, where you are willing to go, etc. We will keep your application on file and will send copies of it to anyone who wants to hire an organic farmer. If you don't have any experience write to us anyway, because we sometimes hear of people who want inexperienced help.

For the time being – until it grows out of hand – we will conduct this service free.

"Influencing" Statistics

The August issue of *Harper's* magazine carried an extremely enlightening article entitled "How to Lie With Statistics." The article did a good job of telling the general public what every statistical worker knows – that figures can be made to say almost anything.

My favorite statistical square knot is the medical man's statement that

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HUMUS and the FARMER

by FRIEND SYKES

TELLS how 750 "worthless acres" were changed into rich farm land by use of the organic method. Filled with graphic descriptions, illustrations, recommendations for making pastures, reclamation of waste or derelict lands, and increasing the water-holding capacity and productivity of the soil. The value of mixed farming and reforestation, the importance of the earthworm, and the mechanization of the compost method are all clearly explained.

Friend Sykes' account begins when what was regarded as one of the best herds in England proved, upon government inspection, to be 66% diseased—the result of deficiencies in the food plants. The herd was dispersed and the valuable farm land sold. Friend Sykes then purchased 750 acres of land on the Salisbury Plain which farmers round about considered practically worthless. He subsoiled it and fertilized with natural manures exclusively. Pasture and crop plants were grown which were rich in minerals and other nutrient materials.

As a result, the cattle and horses were maintained in health and vigor that had been hitherto unknown, and the land is now visited by outstanding agriculturists as one of the most interesting farms in England. 416 pages, 40 photos. **$4.50**

Memos to Farmers

Continued

the average citizen can now look forward to living to be seventy while his counterpart of a hundred years ago could be expected to live only until forty.

Actually, today's man of twenty-five can expect to live only a very few years longer than last century's twenty-five-year-old. The tremendous reduction of childhood deaths, not a general improvement in adult health, has made possible the statement that we now live thirty years longer than we used to.

Let's start with 100 babies of the year 1850. Sanitation and contagious disease prevention not being what they are now, a large percentage of that hundred will die before they reach voting age. But a baby today stands a much better chance of weathering the stresses and strains of immaturity. He has a whole corps of obstetricians, inoculators and sterilizers working to keep clear the microbes and other hazards that used to make childhood so dangerous. So, if we consider only human beings of age 21 on up we find that life is very little less healthy than it used to be.

But now to swing over to statistical gymnastics related to farming. Let's take a look at an experiment with phosphate rock and superphosphate. This particular experiment proved that superphosphate was cheaper to use and more effective. Here is a concluding sentence of the report as printed by one of the experiment stations:

"It required 12.5 times as much phosphoric acid in the form of rock phosphate *applied broadcast* to produce an increase in wheat yield equivalent to the increase produced by 90 lbs. of 20 per cent superphosphate *drilled with the seed.*"

Now, how can you compare honestly the performance of fertilizer broadcast with that of fertilizer drilled with the seed? It's like trying to multiply apples by oranges, and just can't be done.

Like the man from Missouri, I've got to see for myself.

ROBERT RODALE

Soil Building Opinions Differ

(*Continued from page* 47)

conditions or ideal crops for turning under, is too impatient for a grand success to gather daily small quantities of vegetable matter available. And he thus puts off more and more surely the day when his farm fertility will begin to increase. Roadside mowings, leaves, corn cobs, sawdust and such materials added little by little to the soil increase the humus content accordingly and are much to be preferred to that wonderful legume crop that will be grown some day in the future.

What excuse can there be for procrastination when you consider that succulent, green vegetation turned under today will be well decayed within a week or two? A week or two allowed to slip by can be very important in farming. It can mean the difference between a bountiful crop in a dry season or less than a crop, depending on whether your soil can store water for the plant roots. The humus or decayed vegetation you put into the soil will become water tenders and supply your plant roots with their needs twenty-four hours a day.

Most farmers who realize the value of organic farming would like to put half or all of the place into legumes to be turned under, but the plan isn't practical for the man with stock to feed. But they don't put off the practice for that reason; instead, they plant legumes in all land they can spare from production, and in time they will get around to having every acre into soil building crops. It is better to do a little more each year and eventually to have half the farm's fertility increased than to let each season slide by into eternity while you dream of the grand occasion when you will do a bang-up job.

In some towns, the local government gathers up heaps of leaves raked off lawns by householders, and carts the refuse to the dump. This is valuable soil building matter that officials usually will draw a reasonable distance to dump on some farm if requested to do so. One of our town residents had a small farm on the village outskirts and for several years all the leaves picked up by village trucks were dumped there. He had let the ground run to weeds and some grass, but after several years of turning these leaves under, the soil produced a fine grass for grazing, so the place was fenced and rented out to a small stock trader for pasture. Two years later the trader moved away and the plot owner decided that the enriched land ought to be good for truck farming. Half was put into sweet corn and the other half into late potatoes. The sweet corn matured early into nice, well filled ears and sold quickly early in the season at high prices. The potatoes came along in the fall and were stored in the basement until winter when their delivery on orders kept the land owner busy and at the same time profitably occupied.

Add even a little vegetation to your soil today and you have made sure of it. It is these small efforts that do wonders.

Books

Looking Backward

THE agricultural pubishers seem to be in a state of lethargy this month, no reviewable books having crossed our desk within the last four weeks. As an alternative to analyzing a new book, and a good alternative it is, too, I am going to call your attention to an old but still valuable work, *Farm Manures* by Charles Thorne. Incidentally, it was published by the Orange Judd Company, whose namesake is discussed on page 24.

This book was published in 1913. Since then the emphasis in fertilizers has moved from manure toward the artificials, and that switching of emphasis hasn't helped to increase our knowledge of manure, which is, after all, the best fertilizer.

One point about manure that bothers many organic farmers is whether to use it fresh or rotted (composted). Recently one of the leaders of the organic movement in England mentioned in a letter that it was just impractical to use manure fresh and that it must be composted. I don't agree. The book *Farm Manures* quotes a statement by Professor F. T. Shutt of the Dominion Experimental Farms on this point:

"It has been seen .... that even under a good system of preservation, rotting must be accomplished by a loss of fertilizing constituents. Weight for weight, rotted manure is more valuable than fresh manure, containing a larger percentage of plant food and having these elements in a more available condition, but the losses in rotting may, and frequently do, outbalance the benefits. *Undoubtedly the safest storehouse for manure is in the soil.* Once in the soil the only loss that can occur is through draining away of the soluble nitrates, and this is usually very slight. Indeed it is not to be compared with the loss of nitrogen in the fermenting manure heap. We, therefore, unhesitatingly say that the farmer who gets his manure while still fresh into the soil returns to it for the future use of his crops much more plant nourishment than he who allows the manure to accumulate in piles that receive little or no care, and which, therefore, must waste by excessive fermentation or leaching, or both."

But it is not enough to merely spread the manure on the surface and forget about it. It must be disced or plowed in the same day if most of its ability to increase crop yields is to be preserved. Experiments at the Danish Experimental Farms, reported in the book *Irrigated Soils* by D. W. Thorne and H. B. Peterson, have shown that manure left exposed on the surface of the soil for four days loses 57 per cent of its ability to boost yields. (The crop used in this case was oats.)

At this time we come to a conflict between Mr. Thorne, author of *Farm Manures*, and Professor Thorne, author of *Irrigated Soils*. The author of the older book says "the nearest approach (to ideal manure handling) is to haul the manure daily from the stable to the field .... and spread it there at once and as uniformly as possible." But he says that the drying of manure as it lays exposed to the sun does not harm it, and there is where he differs with the authors of *Irrigated Soils*. *They* say that "the best procedure for handling piled manure is to allow it to accumulate in a compact pile or in the sheds until spring. The manure is then rapidly loaded and distributed on the surface of the land and worked into the soil."

We agree with the latter instructions. When manure is put right *in* the soil the acids released by its decomposition go to work on the soil particles and help release the minerals locked up in them.

Although this old book does have its value — from a historical view if from none other — its discolored pages give one the impression that the facts in it may also be a little yellowed. But here is one last gem. Writing under the heading "Terminology," the author states that the word manure is a very close relative to the word maneuver, both having had somewhat similar meanings in earlier days.

ROBERT RODALE

Which Breed of Chickens Produces the Most Eggs?

A study by the New Jersey experiment station of all the pullets entered in official egg laying tests in the United States over a 10-year period — 39,091 birds — indicated no very great difference in the number of eggs produced annually by Rhode Island Reds, Barred Plymouth Rocks, New Hampshires, or White Leghorns, the average in these breeds varying from 227.8 eggs for the R. I. Reds to 210.7 for the White Leghorns. White Plymouth Rocks, White Wyandottes, and Anconas produced considerably fewer, however, ranging from 189.8 eggs per bird annually for the Wyandottes, to 183.5 eggs for the Anconas.

Soil Blowing Increases On the Great Plains

Central and southern Great Plains soil blowing has spread considerably this spring for the second successive year, according to a report from the U. S. Department of Agriculture. Heavy abandonment of this year's winter wheat crop in some localities has set the stage for further extension of the blow area next winter and spring, unless protective cover is provided.

Soil blowing prospects for next winter and spring depend largely upon how this summer's moisture is used to provide protective ground cover. The portions of the area which enter the winter with insufficient vegetative cover may be expected to suffer from wind erosion during the first four or five months of 1951.

The advice now is to seed feed crops this month on lands which do not have adequate wheat stubble or other trashy material, but do have available moisture, so as to establish a protective cover.

Looking toward a long-time stable Great Plains farming situation, the Department and state technical agricultural people recommend that farmers continue to move toward use of the land and water resources of the area in accordance with their capabilities. This involves regrassing, at the first time conditions are favorable, of sand soils and others not suitable for continued cultivation. The areas which need reseeding should be outlined and operated on a grass economy basis.

Conditions in the Great Plains this spring presented the most pessimistic soil blowing outlook since the late thirties, largely because the general lack of precipitation throughout the central and southern portions of the region since last fall resulted in poor moisture conditions over a great area and because of the severe winter. Rainfall deficiencies during the first three months were greatest in the New Mexico portion, where a total of only .71 inches of rain fell during that period.

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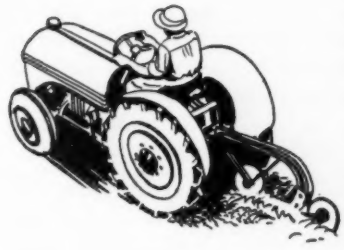

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Livestock

Keep Your Bull Safe!

By BENJAMIN MANZ

SOMEONE has aptly said that the domestic bull is the most dangerous animal in the United States. This statement is not intended to scare anyone into not keeping a bull, but it does merit attention.

The first rule of safety in keeping any bull is not to trust him at any time. Never turn your back to an unrestrained bull, no matter how "good" he is. The National Safety Council recommends that when a bull must be moved, the staff, a handle with a snap on the end to fit the bull's ring, should be used. It is much better than a rope because it enables the leader to keep the bull at a distance.

To be really safe, however, an arrangement should be worked out whereby no one is required to enter the bull pen, even during breeding. The National Safety Council has developed such a plan, one that can be adapted to fit any farm. The plan specifies that the bull have his own pen, either in a separate building, or in a part of the barn. Although not absolutely necessary, it is much better for the bull to also have an excercising lot. An exercising lot makes it unnecessary to have a large inside pen, makes possible the breeding chute, and assures a healthier, and therefore more potent, bull.

The interior of the bull's shed should be of two inch planks nailed on the inside of the studding. It need not reach higher than the bulls head, but make allowance for accumulated manure. The pen should be so arranged that the bull can be cared for without anyone being exposed to him. A feeding alley along one end is almost essential. The water tank should be along here also, protected by heavy planks and with pipes and faucets out of his reach. Bedding bay be accomplished either by penning the bull out in the lot (the National Safety Council recommends a door on a track with ropes to pull it either way) or by dumping the straw through a hole in the ceiling. The Council recommends that the stall be about fourteen feet square.

The exercising lot should be large enough to permit a little running, 16 by 60 feet or more. The fence need not be elaborate, but must be strong. Heavy planks or poles make a good fence. Use heavy 9-foot posts set 3 feet in the ground and 6 to 8 feet apart. Old pipe works well, too. All the materials should be fastened on the inside of the posts except the pipe, which may be set in concrete posts. Information on using concrete posts for bull pens can be obtained by writing to the Portland Cement Association, 33 West Grand Ave., Chicago 10. Writing in the *Farm Safety Review*, Harold Heldreth makes the excellent suggestion of having the bottom rail fourteen inches from the ground so that a quick escape can be made in case of attack. One or two wires charged with a broken current from an approved electric fence charger are useful in protecting the fence from constant beating, but should not be relied on alone to hold an unrestrained bull.

One of the most useful parts of the bull pen is the breeding chute. The breeding chute is essentially a stall in which the cow is tied and which has a swinging gate which permits the breeder to breed cows without exposing himself to the bull. It is simple to operate and would be a good addition to any bull pen. The gate should be slightly longer than the opening so that the bull cannot push it out.

Many breeders, though, prefer to run the bull with the cows, "pasture breeding." In this case the bull should absolutely be restrained, as it is impossible to tend the cows with safety otherwise. Controllers are on the market that are supposed to restrain any bull, but reasonable care should still be used. One of the most practical controllers sells for less than $15 and works on the principle of obstructing the bull's vision. When the bull lowers his head he cannot see at all. It does not interfere with eating or breeding. All controllers should be adjusted frequently as the bull grows. Suspicious behavior of a controlled bull should warrant confinement in a regular bull pen. Better be safe than sorry.

A strong bull ring is essential and should be put on before the bull is one year old. While a chain offers some protection, it should not be relied on in allowing the bull complete freedom. Some breeders use a long chain so that the bull must hold his head high to prevent tripping on it. This is cruel and cannot be recommended. A good dog is some insurance.

Even with controllers and approved confinement there can and will be chances for attack. The best rule is never to trust any bull. Better be suspicious and safe than trusting and sorry!

Harvesting By Tripod

(*Continued from page 17*)

"Value of Product – Analysis has been made of the lucerne from Mr. Rogers' tripod huts, and the value of the product can best be shown by comparison with other material, such as imported Alf-Alfa Meal and Home-Grown Artificially Dried Lucerne Meal.

Analysis

	(1)	(2)	(3)
Fibre	20%	33-38%	18-20%
Protein	17.2%	12-14%	16%
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(Mg. p. Kilo)

(1)–Mr. Rogers' Tripoded Lucerne

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"Feeding Value – It appears from the above that tripod harvesting (even in bad weather and very late in the season) can produce a much superior product to the very best hay".

Opinions of Farmers

Many comments by farmers are available, but the consensus seems to be well expressed in this one note:

"Dear Mr. Proctor,

"You asked me to let you know how we got on with tripoding.

"Enclosed is a piece of our best hay, it has a protein content of 18.1 per cent. The first piece of hay we cut (1-year ley clover and ryegrass) early in May came out at 17.5 per cent. Five other pieces of hay we cut came out between 12 per cent and 13 per cent – no piece was below this.

"Our first year at tripoding has been very successful, and it has shown itself in the quality and quantity of our milk. At no time this winter has our milk had that blueish look.

"It might interest you to know that neighbours who were amused by our methods were surprised and envious of the results. B. Richardson"

Our Own Tripod

After seeing photographs of tripods in action we tried building a rather makeshift hut ourselves. Three three-inch poles nine feet long were tied together at the top to form a tripod and an ordinary sawhorse was placed at the foot of each pole. We made a shock in the middle under the poles and kept stacking around until we reached the outermost part of the sawhorses. Then we kept stacking sheaves of wheat until we reached the top, always keeping the sheaves slanting downward and outward to shed rain. When we finished, the stack had three air intake tunnels at the bottom and a chimney or flue up through the middle to permit a constant flow of air. At this point the air intake constructors are removed and used for making the next tripod. We ran into a little difficulty here, for we had put no skids under the legs of the sawhorses. But they came out all right by jiggling them and the hut has stood up perfectly through high wind and heavy rain.

When we bind grain in the future we plan to use tripods, as they cut down labor costs and yield a better product. Tripods are especially to be recommended in the humid East for producing grain with a lower moisture content and lower incidence of weevils, as well as the other advantage of higher nutritional value in grain which has been air-cured and ripened on the stem.

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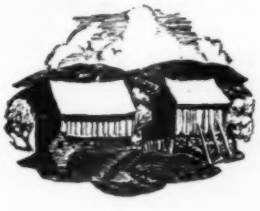
"It might interest you to know that neighbours who were amused by our methods were surprised and envious of the results. B. Richardson"

Our Own Tripod

After seeing photographs of tripods in action we tried building a rather makeshift hut ourselves. Three three-inch poles nine feet long were tied together at the top to form a tripod and an ordinary sawhorse was placed at the foot of each pole. We made a shock in the middle under the poles and kept stacking around until we reached the outermost part of the sawhorses. Then we kept stacking sheaves of wheat until we reached the top, always keeping the sheaves slanting downward and outward to shed rain. When we finished, the stack had three air intake tunnels at the bottom and a chimney or flue up through the middle to permit a constant flow of air. At this point the air intake constructors are removed and used for making the next tripod. We ran into a little difficulty here, for we had put no skids under the legs of the sawhorses. But they came out all right by jiggling them and the hut has stood up perfectly through high wind and heavy rain.

When we bind grain in the future we plan to use tripods, as they cut down labor costs and yield a better product. Tripods are especially to be recommended in the humid East for producing grain with a lower moisture content and lower incidence of weevils, as well as the other advantage of higher nutritional value in grain which has been air-cured and ripened on the stem.



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SOILSERVICE, Townsend, Mass.

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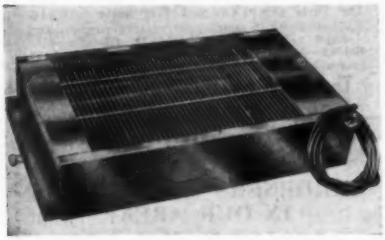
Relief from flies, insects, roaches and other pests is possible without the use of poisons or sprays. The insect problem is readily combatted



with the insect electrocutor recently developed by the Insect Electrocutor Co. A small amount of bait is placed in the bait drawer. Attracted flies are "barbecued" between two grids by a slight, low ampere shock. The dead insects then become the bait, for flies are cannibalistic by nature and eat one another. The double grid system permits human beings to touch the machine without danger of shock. Insect Electrocutor Co. Box 86, Cincinnati 10, Ohio.

Fertilizer Spreader
Dearborn Motors

A new lime and fertilizer spreader has been added to the Dearborn line of farm equipment. This device can be readily used on the organic farm

to spread phosphate rock, lime, granite dust, marl and other ground rock fertilizers. Capable of transporting up to 1,250 pounds of fertilizer, this spreader provides clog free dispersal at rates of flow from 100 to 5,000 pounds per acre. The flow can be regulated to cope with the type of material being used. Dearborn Motors Corp., Detroit 3, Michigan.

pHydrion
Harry Ross

Many plants cannot grow well in soil that is acid, and organics alone will not give the roots of these

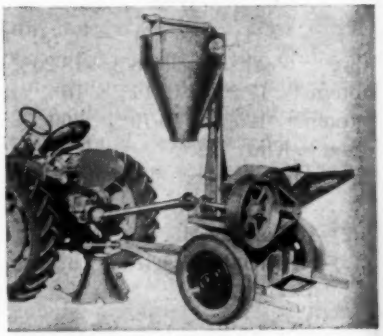
particular plants the right type of soil for their growth. In a case like this the soil's reaction is not suited to a plant which needs an alkaline soil. Safely by correcting the soil reaction (by using lime) can the plants be expected to grow properly. The problem of adjusting the reaction of the soil to suit the needs of a specific plant, or to choose plants which are suitable to a particular soil, has been solved through the development of simple pHydrion soil tests.

The Hydrion papers pictured here come in convenient transparent plastic dispensers. By shaking an earth sample in water and then simply dipping a strip in the liquid, pH values can be determined to an accuracy of 0.25 pH units.

This pHydrion may be obtained for $1.50 from Harry Ross, 70 West Broadway, New York 7, New York.

Power take-off drive
Gehl Brothers

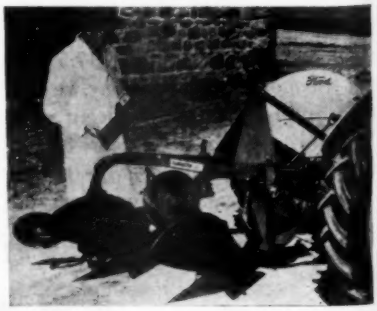
Power loss due to belt slippage is minimized in the new Gehl Power Take-Off Hammer Mill Drive. Power from the tractor is transmit-



ted by a conventional power take-off shaft which is coupled to a multiple V-Belt drive attached directly to the hammer mill. This new Power Take-Off Drive can be attached to any No. 41 Gehl Hammer Mill, and may be had with or without Mill. Gehl Bros. Mfg. Co., West Bend, Wisconsin.

Plow shares
Dearborn Motors

A new plow with "Razor Blade" shares which can be used and discarded like razor blades has been developed by Dearborn Motors to



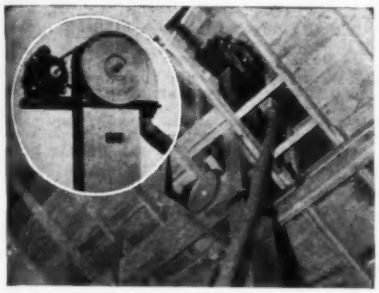
help farmers cut plowing costs. "Razor Blade" shares, such as the one in the accompanying photo, are

used until they are dull and then discarded. Extensive tests revealed the new shares can save the farmer as much as $40 per 100 plowed acres—as compared with the cost of conventional shares which must be resharpened. The plow also has new type bottoms that can be used in hundreds of types of soils. A replaceable shin piece greatly increases the life of the moldboard. Dearborn Motors Corp., Detroit 3, Michigan.

Grain elevator

Hance Mfg. Company

An improved Rounded Head and Side Motor Mounting are some of the features of the new line of

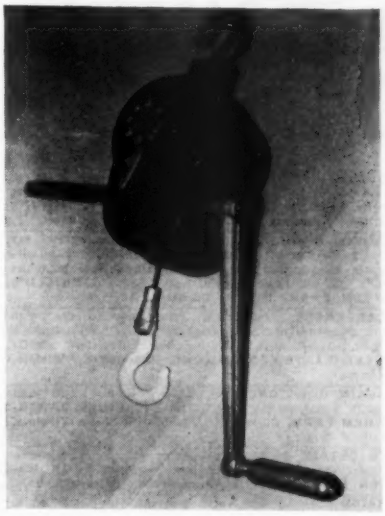


Hance Belt and Bucket Elevators. A product of the J. W. Hance Manufacturing Company, this line of elevators is designed to lift from 50 to 1000 bushels of seed and grain per hour so gently that there is practically no damage to the grain. Hance elevators are pre-assembled at the factory and shipped in 10 foot lengths. They are easily assembled since all bolts and nuts are furnished and sections plainly marked. The elevators enable rapid movement of grain and seed from the field or the car into storage bins, and the speedy transfer of hot grain from one bin to another. J. W. Hance Manufacturing Co., Westerville, Ohio.

Hoist

Farmer's Tool & Supply Co.

A new Hoist that gives the power to do the heavy work that is put off at home, in the shop, or on the farm, because help is needed to get the job done, is being offered by Farmer's Tool & Supply Corp. The EASY PULL Hoist pulls, lifts, stretches, drags, draws, or holds, and will lift a dead weight of 1,000 pounds. The



cable is tested to a 1,700 pound strain and, will hold securely at any desired point. The release is designed to permit perfect control at all times.

Built on the gear and worm principle, all EASY PULL parts are greased packed. Heavy duty noncorroding Oilite bearings are used in its construction. A 50% overload is built into the EASY PULL.

This is a product of the Farmer's Tool and Supply Corporation, 4615 Washington Street, Denver 16, Colo.

Cultivator

Minneapolis-Moline Co.

A new cultivator designed especially for vegetable and other closely spaced row crops will be added to the line now manufactured by Minneapolis-Moline.

This new tractor-mounted vegetable cultivator will have right-hand and left-hand front gangs and a wide single-section rear gang, each containing two toolbars to permit a wide choice for the spacing of the ground working tools. The bars have been designed so tools can be spaced the entire length of each gang.

FARMER'S BOOKLET LIBRARY

Free or inexpensive publications dealing with various phases of farming and farm life

THE following practical and helpful booklets are available to farmers and are offered by the concerns listed. Except where a small charge is mentioned, they can be obtained without cost.

Limestones and legumes—

Because of the tremendous looting of our soils by record crops, it is now necessary to place less emphasis on tilled crops and more on crops that cover and protect. REPAIR AND REBUILD WITH LIMESTONE AND LEGUMES offers a combination that goes a long way toward rebuilding depleted soil. Agricultural Limestone Institute, 1415 Elliot Place, N. W., Washington 7, D. C.

Invaluable, Inseparable trio—

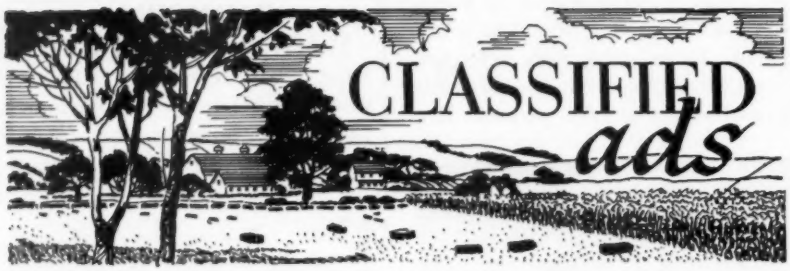
If soils are to be kept productive, their content of organic matter and nitrogen must be maintained at a high level. LIMESTONE, ORGANIC MATTER AND NITROGEN, describes the importance of this trio and how it can be used to best advantage. Agricultural Limestone Institute, 1415 Elliot Place N. W., Washington 7, D. C.

You and the hay you grow—

The making of hay has not kept pace with agriculture's progress and today remains one of the farmer's biggest headaches. HAY IS WHAT YOU MAKE IT tells how to make and keep good hay. Martin Steel Products Corp., Mansfield, Ohio.

Annual flowering plants—

Properly placed annual flowering plants are unsurpassed in maintaining beautiful home and grounds. The government pamphlet, GROWING ANNUAL FLOWERING PLANTS (25 cents) deals completely with this subject. Superintendent of Documents, Gov't Printing Office, Washington 25, D. C.



FERTILIZERS—SOIL CONDITIONERS

Proper use of ROCK PHOSPHATE can make your organic farm pay handsomely. Quotations furnished on finely pulverized Tennessee rock in any quantity and Florida rock in carloads only. Free informative literature tells how. See April issue for prices. **H. R. LEFEVER, R. 1, Spring Grove, Penna.** (at Stoverstown, York County).

FOUR LEAF POWDERED ROCK PHOSPHATE 30%. There is no life without phosphorus for permanent soil improvement with phosphated legumes. Free information —price—and freight rate your station. **JOHN L. MARSON, R. 2, Pleasant Mount, Pa.**

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RUHM'S PHOSPHATE ROCK: Cheapest source of Phosphorus, the element so necessary for all life, contains the trace elements, greatly increases yield and quality of garden and field crops; makes hardy animals, healthy prosperous people. Write **BRYAN & SHEFFER, Portland, Indiana.**

NATURAL PHOSPHATE ROCK Finely ground, Florida 33%—Tenn. 30%. 100 lb. to carload lots. Write for prices and literature. **L. M. BROBST, Phalanx Station, Ohio.**

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RUHM'S 30% PHOSPHATE ROCK. Good for the soil, safe for earthworms, buy it and save freight. **H. F. SCOTT, Domville, Grenville County, Ont., Canada.**

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Hybrid mature EARTHWORMS New England acclimated $5.00 per thousand delivered Fifth Zone. Interesting free circular on easy care and culture. **MERRYVALE FARM, R. 3, Brattleboro, Vermont.**

DOMESTICATED EARTHWORMS for soil building, breaking down compost heaps, and fish bait. Call or write **FULTON EARTHWORM HATCHERY, 1407 17th Street, Anacortes, Washington.**

English MANURE WORMS, satisfied customers say they're best of all. Convert green manure, garbage, directly into Humus without composting. Free pamphlet tells why. 500-$3.00, $5.00 thousand postpaid. **PHILLIPS WORM FARM, Box 22, Bessemer, Ala.**

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TO OBTAIN the most from your soil use Earthworms. Folder and new special offer sent on request. **EDMONDSON HATCHERY, 118 Mirabeau St., Greenfield, Ohio.**

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FOR DOMESTICATED EARTHWORMS to build your garbage and waste materials into organic rich soil call or write **MRS. L. JONES, 1515 E. 76th, Seattle 5, Washington.**

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ORGANIC (FOOD) IODINE combined with other nutrients from LIVING deep-sea vegetables which tap Nature's richest food-mine. Unequalled. **'COL-I-GEN,' 233 Robinson St., Binghamton, N. Y. c/o Dr. I. L. Conover.**

NATURAL SESAME SEED, organically grown, is exceptionally rich in calcium and phosphorus, plus easily-digestible protein, vitamins and other minerals. A "must" in every diet to help promote growth and form strong bones. Delicious, easy to chew. Special 1½ lbs., $1.00 postpaid. Limited quantity imported so act now. **ROBERT ORGANIC FOODS, 613 Washington Ave., Brooklyn 16, N. Y.**

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FIFTH YEAR For WALNUT ACRES home-grown, home-processed, organically raised foodstuffs. Fresh, stone-ground wheat, rye, corn, buckwheat flours, cereals, strawberry jam, honey. **PAUL KEENE, Penns Creek, Pennsylvania.**

CALIFORNIA FOODS. Tree ripened Dates, 5 lbs. $1.75. Large shelled Almonds, 5 lbs. $3.85. Raw, whole Cashews, 5 lbs. $3.95. Unheated Sage Honey, 5 lbs. $1.25. Unheated Virgin Olive Oil, gallon $4.00. Unprocessed dried fruits. Please remit. Express collected. **S. H. JAFFE (E), Lakeside, California.**

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AFRICAN VIOLETS—Guaranteed quality 3 inch plants. Send stamped addressed envelope for list. **ARCADIA VIOLETS, 2337 Nicholson Avenue, Cincinnati 11, Ohio.**

Large Angel Wing BEGONIAS $1.00 each—Guinea Wing $1.25, Large rooted blooming Sultana's all colors asst. 5-$1.00, all colors giant bearded Iris and Chrysanthemum's 15-$1.00. Large asst.—geraniums 3-$1.00; large blooming Achimenes 8-$1.00; Kalamchoe's, large 7-$1.00; 10 different rooted pot plants $1.00 Postpaid. **CHAS. HOVATER, Spruce Pine, Alabama.**

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Rye Improves Soil and Pasture

By Benjamin Manz

Why not cash in on those idle acres this fall instead of letting them lay bare, open to soil erosion? By planting rye on corn, soybean, and other fields after harvest you can get grazing for your cattle during times when other pastures are inactive and turn under the balance, with the manure, in the spring.

Not only does the rye provide a feed which will replace other roughages; it also has a considerable effect on the milk, and probably on the health of the cow. Monroe, Washburn and Thatcher, reporting in *Ohio Farm and Home Research,* Nov.-Dec. 1949, found that cows grazing rye pasture 95 hours over a period of 27 days in the fall showed an increase of 33 per cent in vitamin A content of their milk, while a similar group, barn fed, showed a decrease of 17 per cent vitamin A activity in their milk during the same period. It can readily be seen that this would greatly affect the health of cows ordinarily dry fed for long periods. While milk is not marketed on a quality basis the farmer would be compensated by healthier cows and calves, better milk to drink, and reduced feed bills. If weather permits the rye can also be grazed in spring ahead of other pastures.

Rye can be sown in corn before harvest with a one horse drill, or possibly with garden tractor equipment. It can also be sown after the corn or soybean harvest, providing this is done early enough. Other fields, including those which were in vegetable crops harvested early, would also profit.

In the Ohio experiments Balbo produced more growth for feed, but a slightly inferior feed as regards vitamin A content, in comparison with common rye.

In the spring, what growth is left can be profitably sheet composted, hogged down, or left for seed. Care should be taken to graze animals only on days of favorable weather, especially if your soil packs. Trouble with animals becoming sick from the green feed can largely be prevented by feeding a good meal of hay before turning them out.

Windrow Chopped Alfalfa Highest in Net Returns

Windrow chopped alfalfa hay, compared with alfalfa processed in other ways, this year gave greatest net returns in feeding value as the roughage portion of a steer fattening ration, according to final results of a 165-day feeding test at Colorado A & M Experiment Station.

These results, fitting into a trend noted in similar tests two years previously, showed a net average return per head of $40.94. This was $4.31 more per head than the next ranking processed alfalfa and $11.61 per head more than that showing the least net return. Other hay was processed by baling, stacking, ensiling, and dehydrating.

In the tests, conducted by A. Lamar Esplin and W. E. Connell, animal husbandmen, the seven lots of steers consumed approximately the same amount (15 pounds daily, per steer) of grain and soybean meal (one pound). Those fed hays consumed about 3½ pounds each and those fed silage about nine pounds.

Dehydrated alfalfa consistently has given among the greatest gains, but at more cost, Esplin says. This was revealed in an average total gain of 349 pounds per steer fed alfalfa pellets compared with 335 pounds fed windrow chopped and alfalfa-molasses silage. Windrow chopped was lowest in feed cost per pound of gain at 19.6 cents, compared with 20.4 cents for alfalfa-molasses silage and slightly more than 21 cents for pellets.

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Lady Balfour stresses the necessity of clarifying the connection that exists between "biological soil activity and health." "If the nation's health depends on the way its food is grown," she writes, "then agriculture must be looked upon as one of the health services, in fact the primary health service . . . The greatest social service of them all is, or should be, the provision of the people's food."

The book is packed with such striking data as the experiment demonstrating how cellulose left for a year in virgin soil underwent virtually 100% decomposition when the soil had been treated with compost, whereas in another plot the addition of artificial fertilizers impeded decomposition more than 50%.

Lady Balfour's work — both as a practical farmer and as a keen student of soil research in many lands — has made her name known throughout the world. *The Living Soil,* fascinating to read, is a foundation stone for an agricultural library, a book needed by every farmer — in fact, by anyone who is really interested in learning more about his soil and what makes it work.

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THE ORGANIC FARMER
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Gullies and Rills Not True Indicators of Erosion

Gullies and rills are not reliable indicators of soil erosion losses. Studies at the Ohio Station with artificial (sprinkler) rainfall show that the rate of soil movement off a sloping field during a rain is just as rapid before gullies and rills start to form as after and that considerable soil may be lost without a single rill showing up.

The first step in the erosion process is churning up of soil particles by the raindrops which strike the soil in heavy summer rains like little bombs. Soil thus loosened will start moving as soon as there is enough water flow over the soil surface to carry it. In fact there is some down slope movement merely from splashing. This is called sheet erosion.

As the rain continues the surface of the soil becomes puddled and sealed so that the amount and velocity of runoff increases. When the runoff reaches cutting velocity rills and gullies begin to form. Rills do indicate that the storm has been either severe enough to produce cutting velocities of runoff quickly or that the storm continued long enough for them to build up.

On uneven land, depressions may occur up and down a slope. Runoff concentrates in these and gullies may be cut even in a comparatively short period of time. The deeper the flow of water, the greater is the velocity. In gullies runoff water has cutting velocity; it may have soil-carrying velocity before it reaches cutting speed.

Leaving depressions up and down slopes in sod protects them from deeper cutting, but does not protect the whole field.

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